പതിനാറാം കേരള നിയമസഭ

ഒന്നാം സമ്മേളനം

നക്ഷത്രചിഹ്നമിടാത്ത ചോദ്യം നമ്പർ: 114 **22-06-2026-ൽ മറുപടിയ്ക്ക്**

അജാനൂർ ഫിഷിങ് ഹാർബർ

ചോദ്യം ഉന്നയിച്ച അംഗങ്ങൾ	**മറുപടി നൽകിയ മന്ത്രി**
ശ്രീ. ഗോവിന്ദൻ പള്ളിക്കാപ്പിൽ	ശ്രീ. വി. ഡി. സതീശൻ (മുഖ്യമന്ത്രി)

(എ) അജാനൂർ ഫിഷിങ് ഹാർബർ സ്ഥാപിക്കുന്നതിനുള്ള നടപടികൾ സ്വീകരിച്ചിട്ടുണ്ടോ; എങ്കിൽ ഇതുമായി ബന്ധപ്പെട്ട വിവിധ വകുപ്പുകളും ഏജൻസികളും നടത്തിയ പഠനങ്ങൾ, തയ്യാറാക്കിയ എസ്റ്റിമേറ്റ് റിപ്പോർട്ട് എന്നിവയുടെ വിശദാംശങ്ങളും പകർപ്പുകളും ലഭ്യമാക്കാമോ;

മറുപടി: അജാനൂർ ഫിഷിംഗ് ഹാർബർ സ്ഥാപിക്കുന്നതിനുള്ള നടപടികൾ സ്വീകരിച്ചിട്ടുണ്ട്. ഇതുമായി ബന്ധപ്പെട്ട് വിവിധ ഏജൻസികൾ നടത്തിയ ചുവടെ ചേർത്തിരിക്കുന്ന പഠനങ്ങൾ. തയ്യാറാക്കിയ എസ്റ്റിമേറ്റ് റിപ്പോർട്ടുകൾ എന്നിവയുടെ പകർപ്പുകൾ **അനുബന്ധം-I** ആയി ചേർക്കുന്നു.

1. Mathematical Model Studies for Littoral Drift & shoreline changes due to the proposed Fishery Harbour at Ajanur - Technical Report No.5357 February 2016.

2. Wave propagation Studies to determine Wave climate for the development for Fish Landing Facilities at Ajanur October 2016.

3. Additional mathematical model studies for wave Tranquility for revised layout of Fisheries Harbour at Ajanur, Kerala July 2022.

4. Desk and Wave Flume Studies for the Design of Breakwater For Fishery Harbour At Ajanur In Kasargod District, Kerala Technical Report No.6177 November 2023.

5. Mathematical Model Studies to assess hydrodynamics and siltation due to construction of Fishing Harbour at Ajanur at Kerala. Technical Report N0.6283 July 2024.

6. Environmental impact assessment report for proposed construction of Ajanur Fishing Harbour Prepared by UltraTech, Environmental Consultancy & Laboratory September 2025

7. Risk assessment and disaster management plan for proposed construction of Ajanur Fishing Harbour Prepared by UltraTech, Environmental Consultancy & Laboratory, September 2025

8. HTL, LTL, AND CRZ for the project area proposed for the construction of Ajanur fishing harbour in Ajanur grama panchayat, Kasaragod district, Kerala Prepared by National Centre for Earth Science Studies, May 2025.

9. Detailed Project Report on Construction of Ajanur Fishing Harbour in Kasargod District, October 2024

(ബി) പദ്ധതിയുമായി ബന്ധപ്പെട്ട് പി. എം. എം. എസ്. വൈ. സ്വീകരിച്ച നടപടികളുടേയും നൽകിയ റിപ്പോർട്ടുകളുടേയും വിശദാംശങ്ങളുടെ പകർപ്പ് ലഭ്യമാക്കാമോ?

മറുപടി: കാസർഗോഡ് ജില്ലയിലെ അജാനൂർ മത്സ്യബന്ധന ഉറമുഖ നിർമ്മാണത്തിനായുള്ള 101.33 കോടി രൂപയുടെ വിശദമായ പദ്ധതി രൂപരേഖ പി.എം.എം.എസ്.വൈ സ്കീമിൽ ഉൾപ്പെടുത്തി അംഗീകാരം ലഭ്യമാക്കുന്നതിനായി ഹാർബർ എൻജിനീയറിംഗ് വകുപ്പ് സമർപ്പിച്ചിരുന്നു. തുടർന്ന് പ്രോജക്ട് അപ്രൈസൽ കമ്മിറ്റിയുടെ നിർദ്ദേശ പ്രകാരം ഭാവി വികസനം കൂടി കണക്കിലെടുത്ത് ഹാർബറിന്റെ ബേസിൻ ഏരിയ വലുതാക്കി പദ്ധതിയുടെ പുതുക്കിയ 200 കോടിയുടെ പദ്ധതി രൂപരേഖ 17/10/2024-ന് ഹാർബർ എൻജിനീയർ വകുപ്പ് ലഭ്യമാക്കി. സർക്കാരിൽ ലഭ്യമായ ശുപാർശ 15/01/2025 ൽ നടന്ന സ്റ്റേറ്റ് ലെവൽ അപ്രൂവൽ & മോണിറ്ററിംഗ് കമ്മിറ്റി (SLAMC) അംഗീകരിക്കുകയും കേന്ദ്ര സർക്കാരിന് 24/01/2025-ന് നൽകുകയും ചെയ്തിരുന്നു. തുടർന്ന് സെൻട്രൽ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഓഫ് കോസ്റ്റൽ എൻജിനീയറിംഗ് ഫോർ ഫിഷറി (CICEF) നടത്തിയ ടെക്നിക്കൽ സ്റ്റഡിനി പ്രകാരം പദ്ധതി ഇക്കോണമിക്കലി വയബിൾ അല്ല എന്ന് കേന്ദ്ര സർക്കാരിൽ നിന്നും 15/10/2025 ൽ കത്ത് ലഭിക്കുകയും ആയതിന്റെ വയബിലിറ്റിയും ആവശ്യകതയും അറിയിച്ചുകൊണ്ട് ഹാർബർ എഞ്ചിനീയറിംഗ് വകുപ്പ് സർക്കാരിൽ ലഭ്യമാക്കിയ ശിപാർശ ഫിഷറീസ് ഡയറക്ടറുടെ റിപ്പോർട്ടിനായി നല്കിയിട്ടുള്ളതാണ്. വിശദാംശങ്ങൾ **അനുബന്ധം-II** ആയി ചേർക്കുന്നു.

സെക്ഷൻ ഓഫീസർ



GOVERNMENT OF INDIA
CENTRAL WATER AND POWER RESEARCH STATION
KHADAKWASLA, PUNE – 411 024



MATHEMATICAL MODELLING FOR COASTAL ENGINEERING

TECHNICAL NOTE
July 2022

ADDITIONAL MATHEMATICAL MODEL STUDIES FOR WAVE TRANQUILITY FOR REVISED LAYOUT OF FISHERIES HARBOUR AT AJANUR, KERALA

Dr. R.S. Kankara
Director

Technical Note **Date: July 2022**

Title: ADDITIONAL MATHEMATICAL MODE STUDIES FOR WAVE TRANQUILITY FOR REVISED LAYOUT OF FISHERIES HARBOUR AT AJANUR, KERALA

Officers Responsible for Conducting the Studies

Smt Komal Vighe, Assistant Research Officer, Shri Rahul Sawant, Research Assistant, under the overall supervision of Dr. Jiweshwar Sinha, Scientist-E.

Name and Address of Organization Conducting the Studies
Mathematical Modelling for Coastal Engineering
Central Water and Power Research Station, Pune, India

Name and Address of Authority Sponsoring the Studies
Chief Engineer, Harbour Engineering Department,
Kamaleswaram, Manacaud, Thiruvanathapuram, Kerala – 695009

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Government of India
Ministry of Jal Shakti
Department of Water Resources, River Development & Ganga Rejuvenation
Central Water and Power Research Station
Khadakwasla, Pune - 411 024

Technical Note **Date: July 2022**

ADDITIONAL MATHEMATICAL MODE STUDIES FOR WAVE TRANQUILITY FOR REVISED LAYOUT OF FISHERIES HARBOUR AT AJANUR, KERALA

1. INTRODUCTION

Harbour Engineering Department, Government of Kerala has a proposal to develop a fishing harbour at Ajanur village situated about 15km south of Kasargod district at Latitude 12.33^0 N and Longitude 75.18^0 E in Kerala state (Figure 1) on the west coast of India. As per layout 4 suggested by CWPRS vide T.R. No. 5436, Nov 2016 (Ref.1) the harbour basin area comes out to be about 19ha. Considering the future expansion suggested by the Technical Sanction Committee of PMMSY schemes vide HED Letter No.D4/9509/06/CE dated 16-06-2022, Harbour Engineering Department proposed a revised layout of the Ajanur fishing harbor by increasing basin area of the harbor upto 26ha. The revised layout of the proposed harbour would consist of 1150m long north breakwater and 425m long south breakwater. Revised layout of the proposed harbor at Ajanur is shown in Figure 2. In the figure in order to control the shifting and functioning of Chittari River mouth, river training works at the mouth is also included. The river training works in the form of 435m long breakwater at north side of northern breakwater is proposed based on littoral drift studies carried out at CWPRS (Ref.2) which indicated that southward drift was predominant and littoral zone was estimated to be in the range of 250m from the coastline. Earlier, based on wave tranquility studies undertaken at CWPRS, Layout 4 having 1000m long northern breakwater and 375m southern breakwater was suggested for the proposed harbor at Ajanur. In order to increase the basin area of the proposed harbor at Ajanur, northern and southern breakwaters are extended upto 1150m and 425m respectively. In order to examine the tranquility in the harbor basin, model studies were again referred to CWPRS. The technical note contains details of wave tranquility studies for the revised layout with different alternatives of north breakwater length.

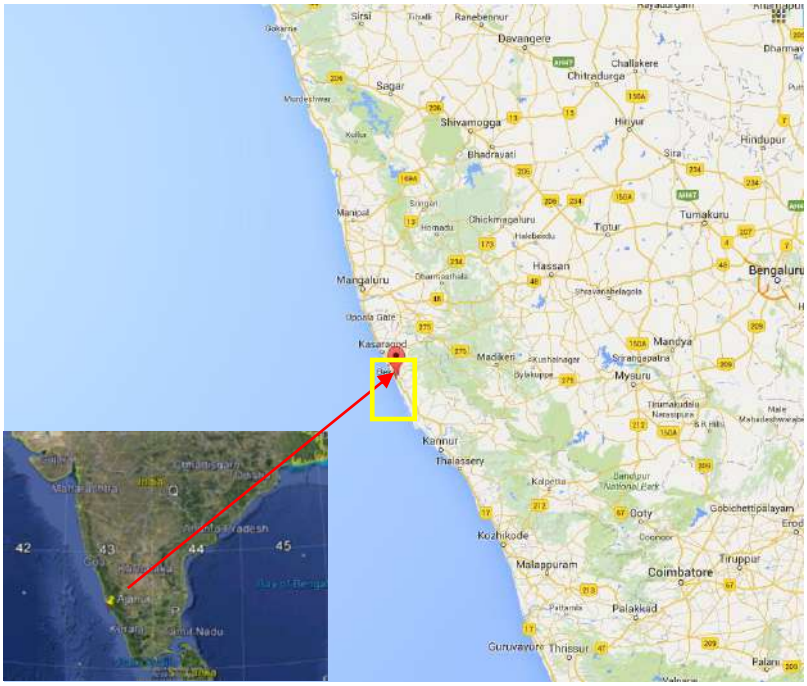


Figure 1 Index map of Ajanur site, Kerala

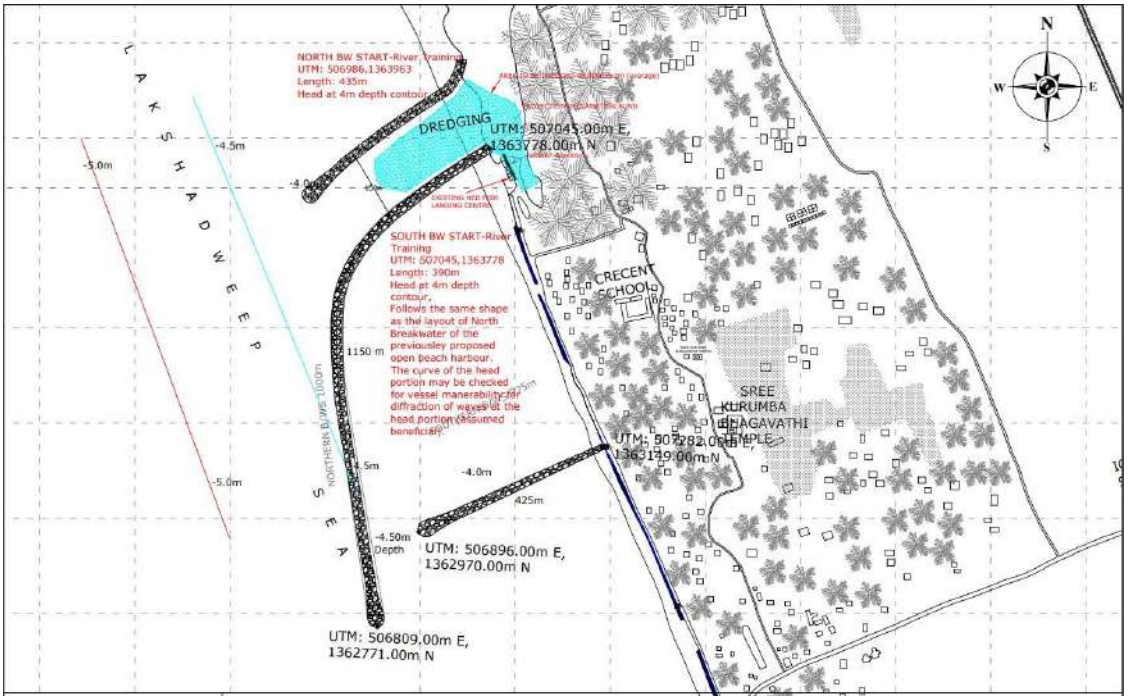


Figure 2 Revised layout of proposed harbor at Ajanur, Kerala

2. SCOPE OF STUDIES

Mathematical model studies for wave tranquility were carried out with the following scope:

1. Transformation of wave height and wave direction from deep water to 10m depth using MIKE 21 SW Model (Spectral Wave Model) carried out at CWPRS detailed in T.R. No. 5436, November 2016 (Ref.1).
2. Simulation of wave propagation to obtain wave height distribution in harbor basin using MIKE 21 BW model.

2.1 Tidal Data

The proposed site of development is in the south of Kasargod. Important tidal levels at Kasargod with respect to Chart Datum (As per Admiralty Chart No. 217 and 2029) are reported to be as under:

MHHW : 1.4m
MLHW : 1.3m
MSL : 1.0m
MHLW : 0.9m
MLLW : 0.4m

This indicates that the maximum tidal range in the study area is of the order of 1.0m. Tidal currents are generally parallel to the coastline and directed northward during flood as well as ebb tide with the maximum magnitude of the order of 0.4m/s (Littoral drift studies carried out at CWPRS T.R. No. 5357 of February 2016) (Ref.2).

3. MATHEMATICAL MODEL STUDIES

Mathematical model studies for examining the wave conditions in the proposed fishery harbor with revised layout were carried out by MIKE 21 BW model. The frequency distribution of wave heights from different directions at the inshore location in 10m depth is given in Table 1 to Table 4 Corresponding wave rose diagrams are presented in Figure 3 to Figure 6.

Table 1 Percentage occurrence of Wave height & direction at Ajanur for South-West monsoon (June-Sept)

Wave Height (m)	0.30	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	TOTAL
Direction										Calm %	3.03
180	0.39	0.98	0.20	0.20	0.00	0.00	0.00	0.00	0.00	0.00	1.76
202.5	0.59	1.08	2.74	1.08	0.20	0.00	0.00	0.00	0.00	0.00	5.67
225	0.49	1.17	2.93	2.54	0.68	0.20	0.00	0.00	0.00	0.00	8.01
247.5	0.49	2.15	4.20	2.74	2.05	2.64	0.00	0.00	0.00	0.00	14.27
270	2.15	5.18	11.53	12.12	12.61	5.87	1.37	0.00	0.00	0.00	50.83
292.5	0.68	6.55	5.08	3.71	0.39	0.00	0.00	0.00	0.00	0.00	16.42
TOTAL	4.79	17.11	26.69	22.39	15.93	8.70	1.37	0.00	0.00	0.00	100.0

Table 2 Percentage occurrence of Wave height & direction at Ajanur for North-East monsoon period (Oct-Jan)

Wave Height (m)	0.30	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	TOTAL
Direction										Calm %	51.71
180	1.05	1.90	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.14
202.5	2.67	3.04	3.71	1.24	0.57	0.10	0.00	0.00	0.00	0.00	11.32
225	0.95	1.24	0.86	0.48	0.10	0.10	0.00	0.00	0.00	0.00	3.71
247.5	1.14	2.19	1.62	0.76	0.67	0.67	0.00	0.00	0.00	0.00	7.03
270	1.43	3.33	3.04	1.33	0.57	0.00	0.00	0.00	0.00	0.00	9.69
292.5	5.51	5.89	1.52	0.38	0.10	0.00	0.00	0.00	0.00	0.00	13.40
TOTAL	12.75	17.59	10.93	4.18	2.00	0.86	0.00	0.00	0.00	0.00	100.00

Table 3 Percentage occurrence of Wave height & direction at Ajanur for non-monsoon period (Feb-May)

Wave Height (m)	0.30	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	TOTAL
Direction										Calm %	41.23
157.5	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
180	3.34	2.55	1.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.06
202.5	1.76	2.84	2.55	1.37	0.00	0.10	0.00	0.00	0.00	0.00	8.62
225	1.08	1.08	0.39	0.59	0.69	0.49	0.00	0.00	0.00	0.00	4.31
247.5	0.69	0.98	1.08	1.18	0.49	0.00	0.00	0.00	0.00	0.00	4.41
270	2.15	4.11	3.33	0.78	0.29	0.00	0.00	0.00	0.00	0.00	10.68
292.5	9.21	9.99	0.49	0.88	0.00	0.00	0.00	0.00	0.00	0.00	20.57
315	2.74	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.04
TOTAL	21.06	21.84	9.01	4.80	1.47	0.59	0.00	0.00	0.00	0.00	100.00

Table 4 Percentage occurrence of Wave height & direction at Ajanur for entire period (Jan-Dec)

Wave Height (m)	0.3	0.5	1	1.5	2	2.5	3	3.5	4	4.5	TOTAL
Direction										Calm %	32.07
157.5	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
180	1.59	1.81	0.52	0.07	0.00	0.00	0.00	0.00	0.00	0.00	3.99
202.5	1.67	2.32	3.00	1.23	0.26	0.07	0.00	0.00	0.00	0.00	8.55
225	0.84	1.16	1.39	1.20	0.49	0.26	0.00	0.00	0.00	0.00	5.35
247.5	0.75	1.77	2.30	1.56	1.07	1.10	0.00	0.00	0.00	0.00	8.56
270	1.90	4.21	5.97	4.74	4.49	1.96	0.46	0.00	0.00	0.00	23.72
292.5	5.12	7.48	2.36	1.66	0.16	0.00	0.00	0.00	0.00	0.00	16.78
315	0.91	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.01
TOTAL	12.82	18.85	15.55	10.46	6.47	3.39	0.46	0.00	0.00	0.00	100.00

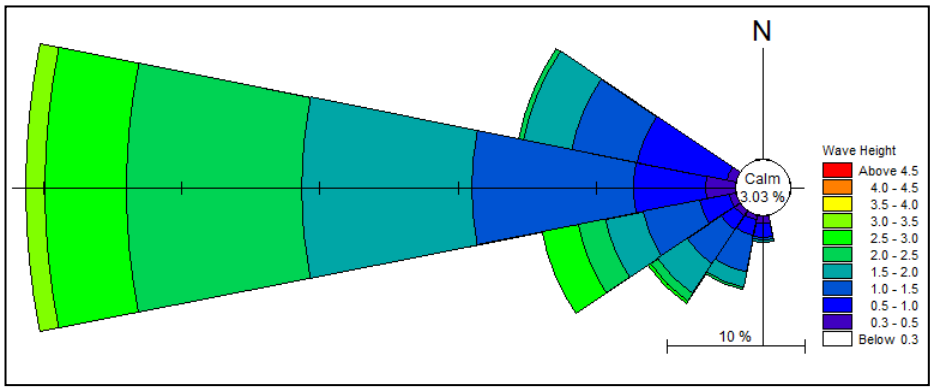


Figure 3 Wave rose diagram near Ajanur for South West monsoon (Jun-Sept)

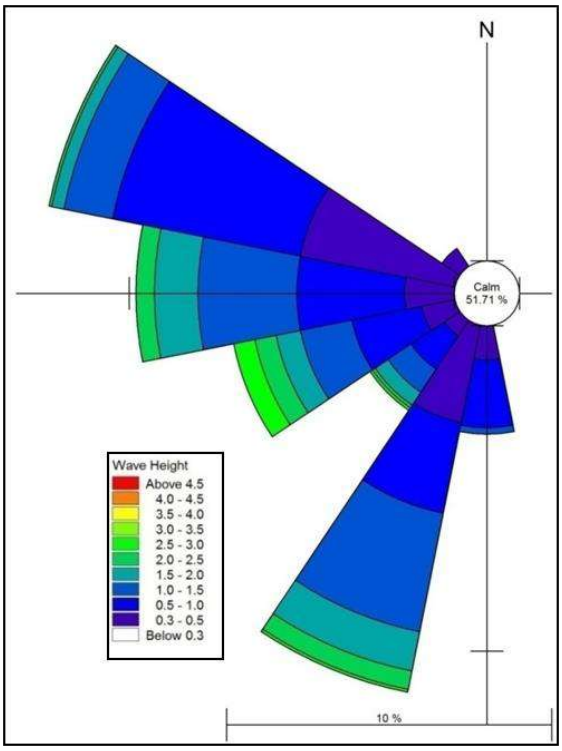


Figure 4 Wave rose diagram near Ajanur for North East monsoon (Oct-Jan)

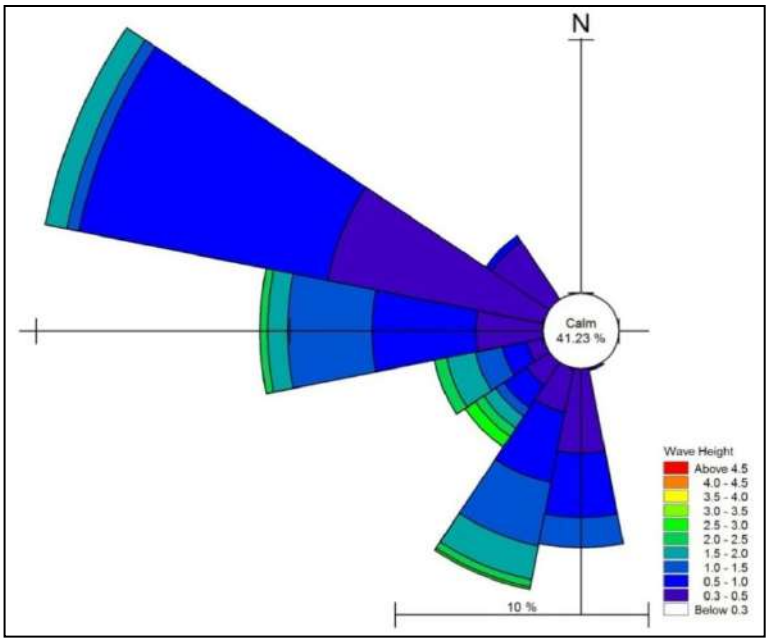


Figure 5 Wave rose diagram near Ajanur for non-monsoon (Feb-May)

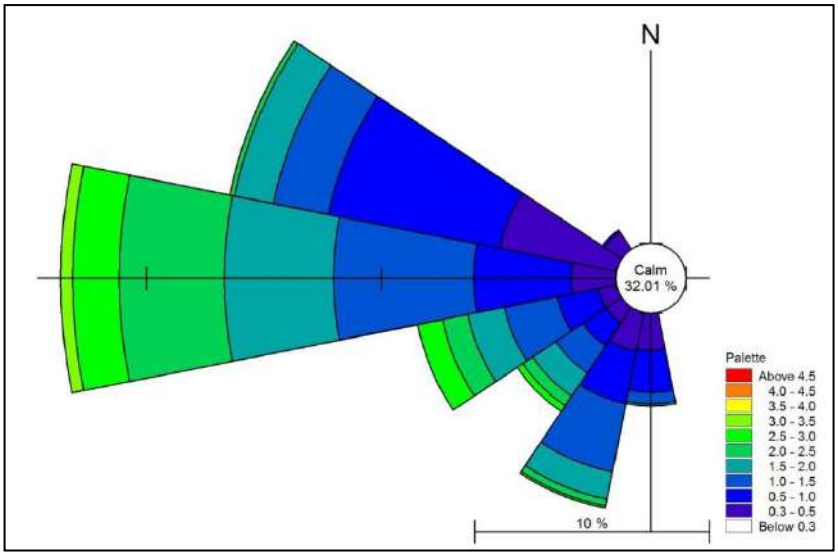


Figure 6 Wave rose diagram near Ajanur for entire year (Jan-Dec)

Figure 6 shows the percentage occurrence of wave distribution at 10m depth near Ajanur for the entire year. From the table 4, it can be interpreted that the predominant wave directions are SSW, SW, WSW, West and WNW with the percentage occurrence of 8.55, 5.35, 8.56, 23.72 and 16.78 respectively. The maximum wave height of 3.0m is observed from West direction. Table 1 shows the percentage occurrence of wave distribution at 10m depth near Ajanur for South-West Monsoon season. From table 1, it can be interpreted that the predominant wave directions are SW, WSW, West and WNW with the percentage occurrence of 8.02, 14.27, 50.83, and 16.42 respectively. The maximum wave height of 3.0m is observed from West direction. Table 2 shows the percentage occurrence of wave distribution at 10m depth near Ajanur for the North-East Monsoon season. From table 2, it can be interpreted that the predominant wave directions are SSW, SW, WSW, West and WNW with the percentage occurrence of 11.32, 3.71, 7.03, 9.7 and 13.4 respectively. The maximum wave height of 2.5m is observed from West-South-West direction. Table 3 shows the percentage occurrence of wave distribution at 10m depth near Ajanur for the Non-Monsoon season. From table 3, it can be interpreted that the predominant wave directions are SSW, SW, WSW, West and WNW with the percentage occurrence of 8.62, 4.31, 4.41, 10.68 and 20.57 respectively. The maximum wave height of 2.5m is observed from South-West direction.

Hence the wave conditions as input to the wave tranquility studies with MIKE 21 BW model have been shortlisted based on the percentage of occurrence are tabulated below in Table 5.

Table 5 Input wave conditions for wave tranquility studies

Incident Wave Direction	Incident Wave Height
SSW	1.5
SW	2.0
WSW	2.5
WEST	2.5
WNW	1.5

The permissible wave disturbance at berthing place depends on ship size, mooring & berthing system, method of loading & unloading used at berth and orientation of berth with respect to wave direction etc. The wave tranquility studies were carried out assuming wave tranquility limit as 0.3m which is considered as safe for berthing of fishing boats/vessels.

4. WAVE TRANQUILITY STUDIES

Mathematical model studies to assess wave tranquility in the harbour basin were carried out using MIKE 21 BW. The mean sea levels at Mangalore 1.0m, Kasargod1.0m, Kannur 1.02m have been obtained from Admiralty Charts. Therefore the mean tidal level of 1.0m at Kasargod has been considered for the wave tranquility studies using MIKE 21 BW. The model was simulated for all possible input wave conditions derived from wave transformation studies for the revised harbour layout proposed (by HED) and for three different scenarios of the revised layout by curtailing north breakwater length.

4.1 MIKE 21 BW

The Boussinesq Wave model, MIKE 21 BW, is the state-of-the-art numerical model for calculation and analysis of short and long-period waves in ports, harbours and coastal areas. MIKE 21 BW can also be used for detailed modeling of wave-induced current fields, surf zone dynamics and swash zone oscillations. The model is based on the numerical solution of the enhanced Boussinesq equations formulated by Madsen and Sørensen.

MIKE 21 BW is capable of reproducing combined effects of all important wave phenomena of interest in port, harbour and coastal engineering. These include:

1. Shoaling
2. Refraction

3. Diffraction
4. Wave breaking
5. Bottom friction
6. Moving shoreline
7. Partial reflection and transmission
8. Non-linear wave-wave interaction
9. Frequency spreading
10. Directional spreading

4.2 Wave Tranquility Studies for Revised Layout

As per the revised layout, northern breakwater is having a length of 1150m, southern breakwater is having length of 425m. The breakwater proposed for River training work is 435m long (Figure 2). Depth in harbor basin is considered as -4.0m.

4.3 Model Operation with Revised Layout

To simulate wave propagation with the revised layout, bathymetry was prepared as shown in Figure 7. The model region is considered as 4.0km X 4.0km and is discretised in a rectangular grid size of 3m.

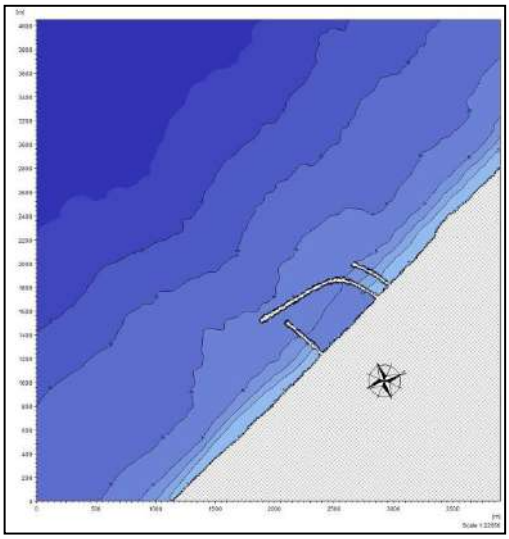


Figure 7 Bathymetry for wave propagation studies (revised layout)

The predominant wave directions at nearshore are SSW, SW, WSW, West and WNW with incident wave heights of 1.5m, 2.0m, 2.5m, 2.5m and 1.5m respectively (Table 5). The model is simulated for wave disturbance in the revised layout of harbour under five given wave conditions. The results are shown and discussed below.

Firstly, the model was simulated for incident wave height of 1.5m having direction SSW. The wave propagation and Wave height distribution in the model region and in the harbour are shown in Figure 8. From the figure, it could be seen that wave heights inside the harbor basin are less than 0.3m making harbour basin tranquil.

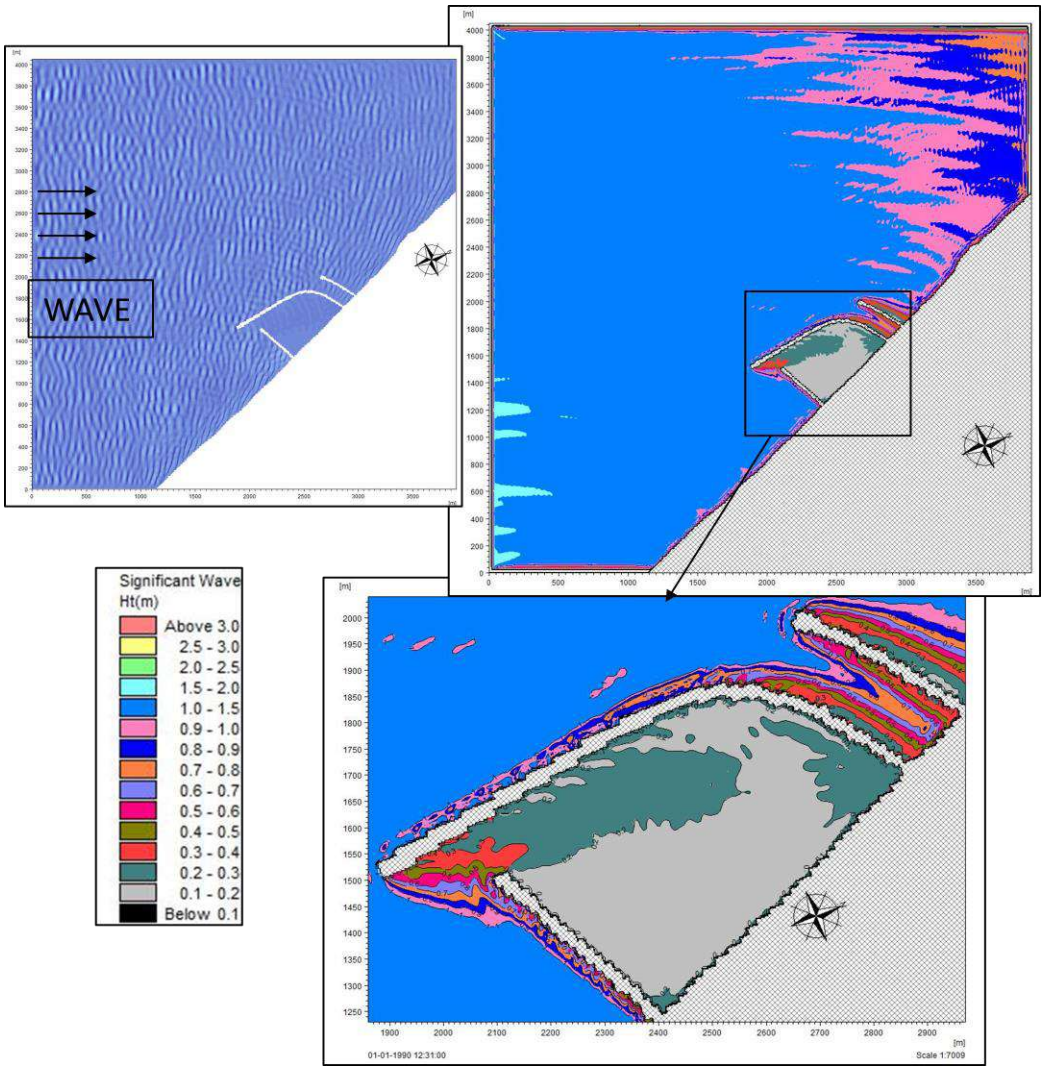


Figure 8 Wave propagation and wave height distribution in harbour for wave from SSW direction (incident wave height 1.5m)

Model was then simulated for incident wave height of 2.0m with direction SW. The wave propagation and Wave height distribution in the model region and in the harbor are shown in Figure 9 which shows that wave heights are less than 0.3m which represents tranquil condition for fishing vessels.

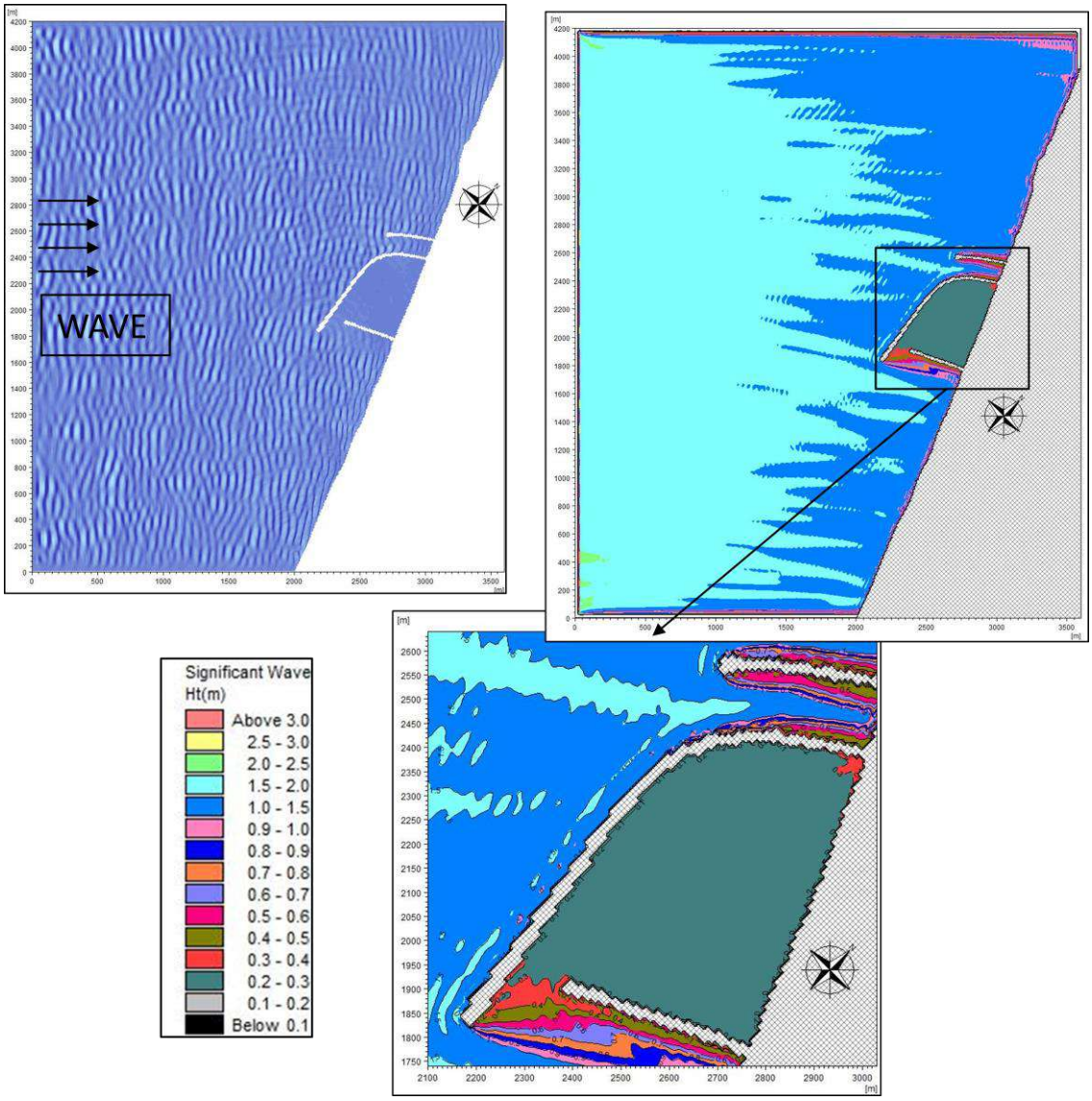


Figure 9: Wave propagation and wave height distribution in harbour for waves from SW direction (incident wave height 2m)

The wave propagation and wave height distribution in model region and in the harbor obtained from model simulation for incident wave height of 2.5m and direction WSW are shown in Figure 10. From the results, it could be seen that the entire harbour basin is tranquil as wave heights are less than 0.3m.

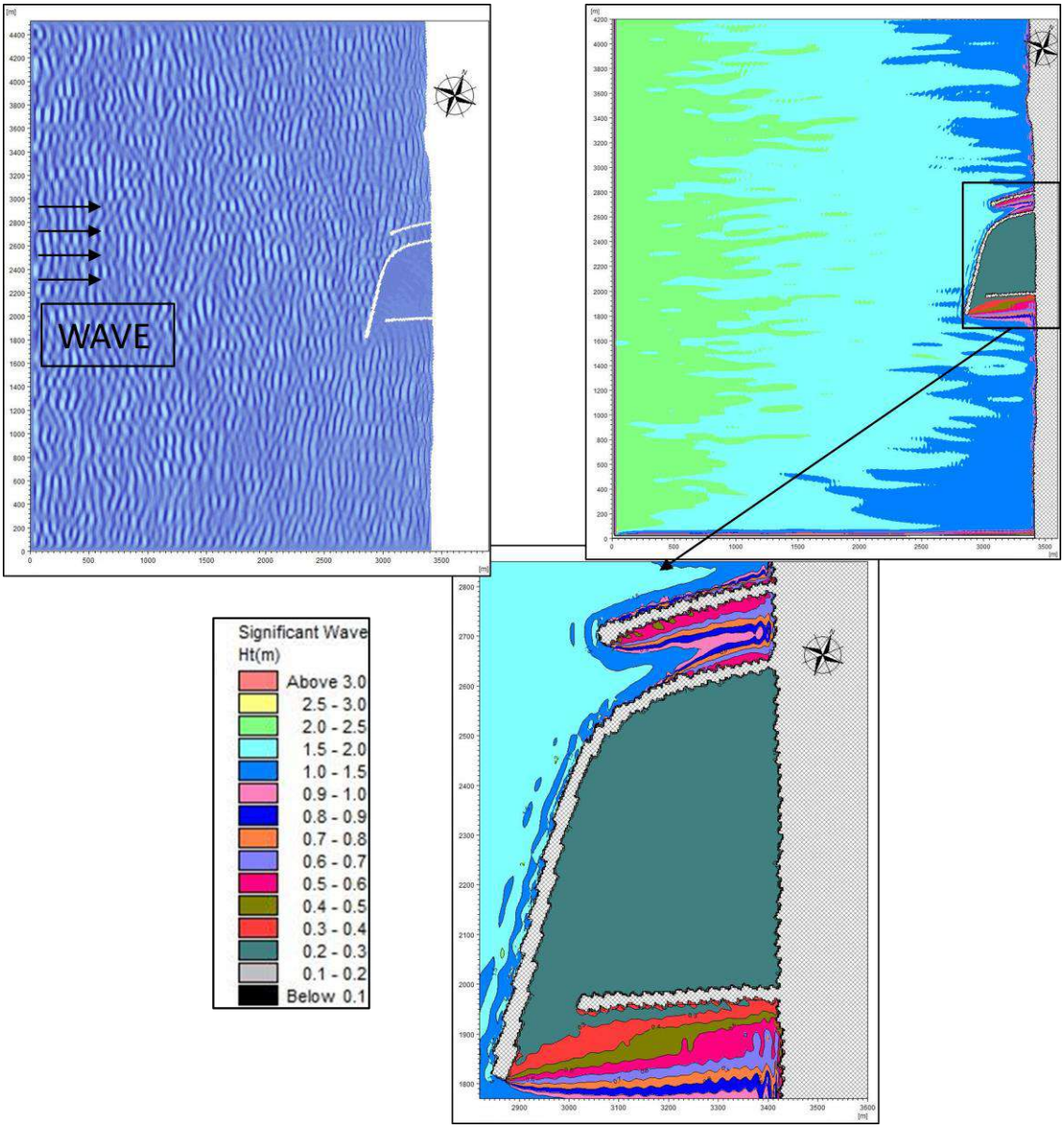


Figure 10 Wave propagation and wave height distribution in the harbour for waves incident from WSW direction (incident wave height 2.5m)

Similarly the model simulation for incident wave height of 2.5m and direction West indicated that complete harbour basin is tranquil with wave height less than 0.3m.The wave propagation and wave height distribution in the model region and in the harbour is shown in the Figure 11.

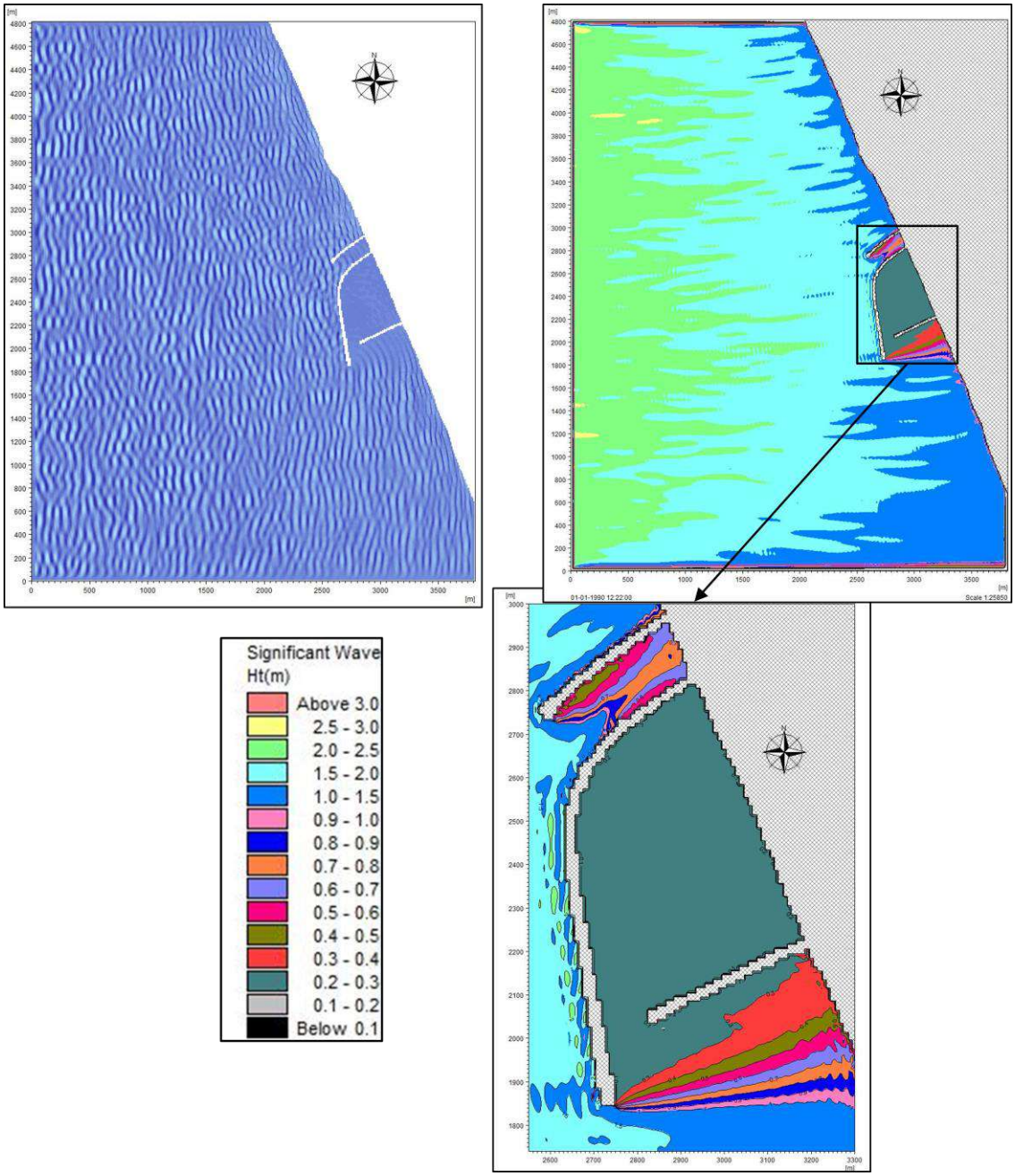


Figure 11 Wave propagation and wave height distribution in harbour for wave from West direction (incident wave height 2.5m)

Similarly the model simulation is carried out for incident wave height of 1.5m and direction WNW which indicated that entire harbour basin is tranquil as wave height less than 0.2m.The wave propagation and wave height distribution in the harbour is shown in Figure 12.

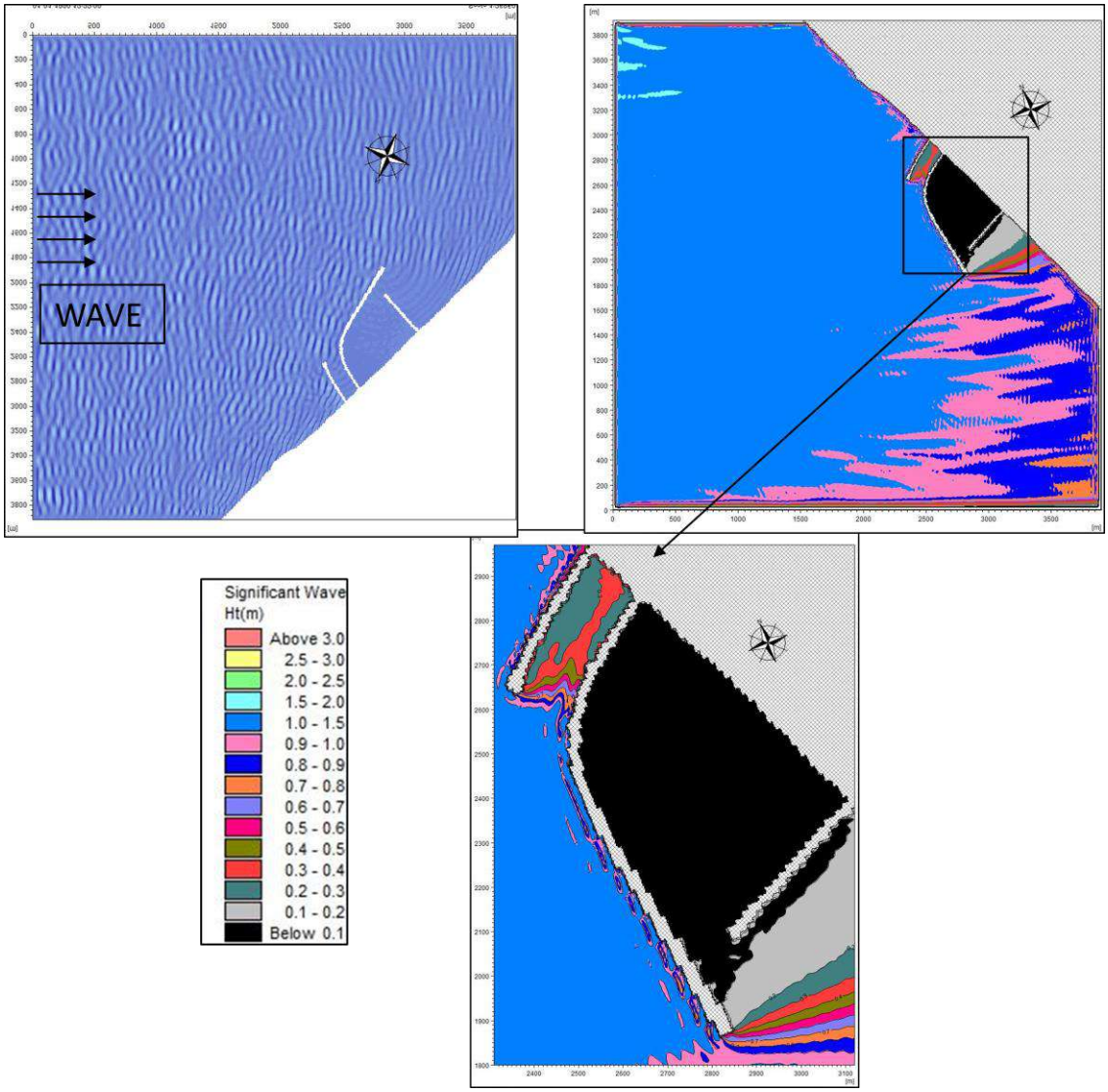


Figure 12 Wave propagation and wave height distribution in harbour for waves from WNW direction (incident wave height 1.5m)

Thus, considering wave tranquility limit 0.3m sufficient for fishing vessels likely to be operated in the region, the revised layout of the harbor (shown in Figure 2) would be suitable for operation throughout the year.

Further, in order to optimize the harbor layout, wave model was simulated for three different scenarios by curtailing length of the southern breakwater by 100m, 75m and 50m. The model was simulated for critical wave direction of SSW with incident wave height of 1.5m. The simulation results of three scenarios are discussed as under.

4.4 Model Operation with Scenario-1 *(by 100m Curtailment of Northern Breakwater)*

Bathymetry with the Scenario-1 i.e. revised layout having 100m curtailment of northern breakwater is shown in Figure 13.

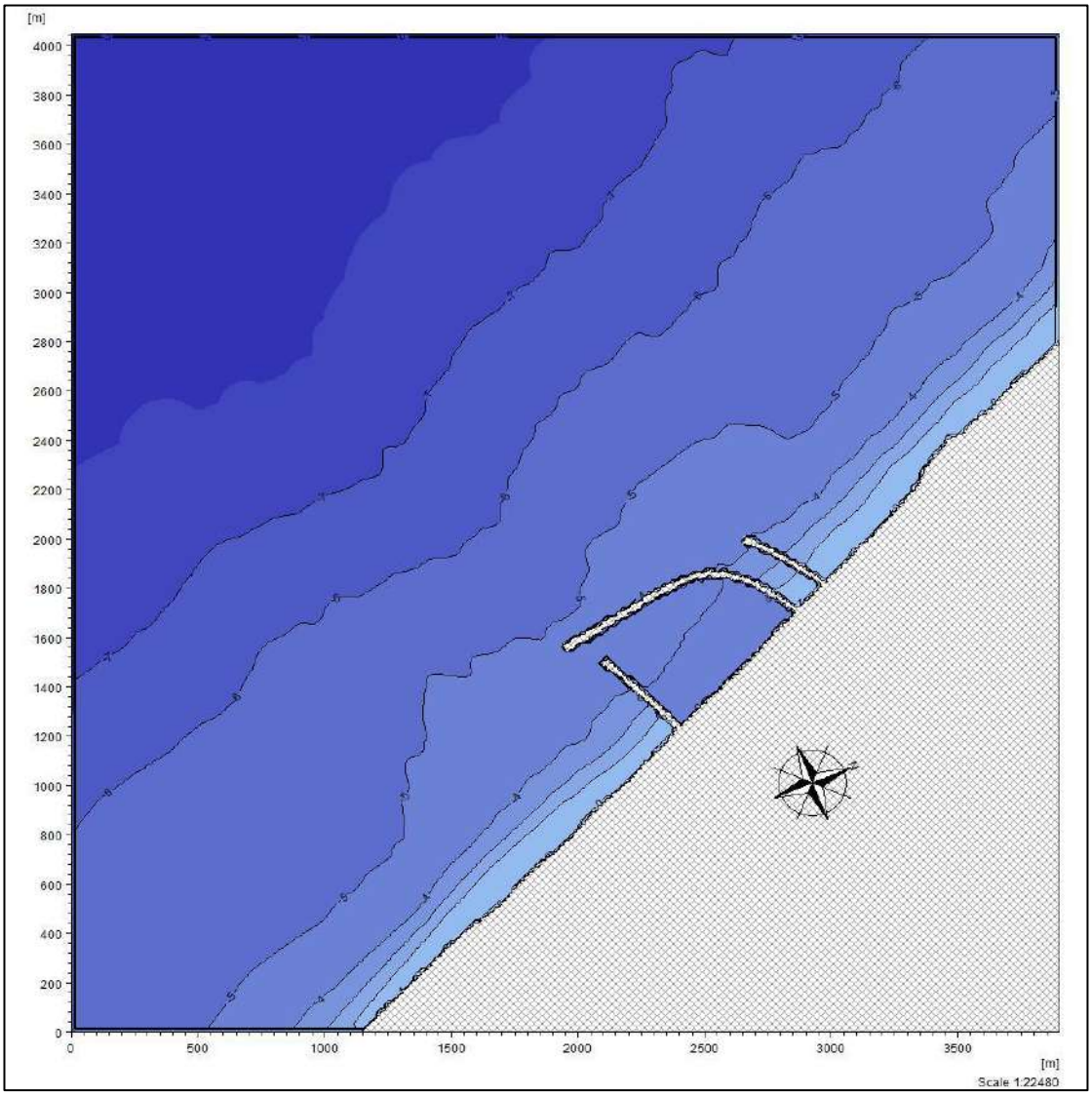


Figure 13 Bathymetry under Scenario-1 (revised layout with 100m curtailment of Northern breakwater)

The model is operated to simulate wave disturbance in harbour region under Scenario-1 (revised layout with 100m curtailment of northern breakwater) with SSW direction and wave height 1.5m. The wave propagation and wave height distribution in the model region and in the harbor are shown in Figure 14. From the figure, it is seen that wave heights of more than 0.3m could able to enter into the harbor basin making it rough (wave) to some extent.

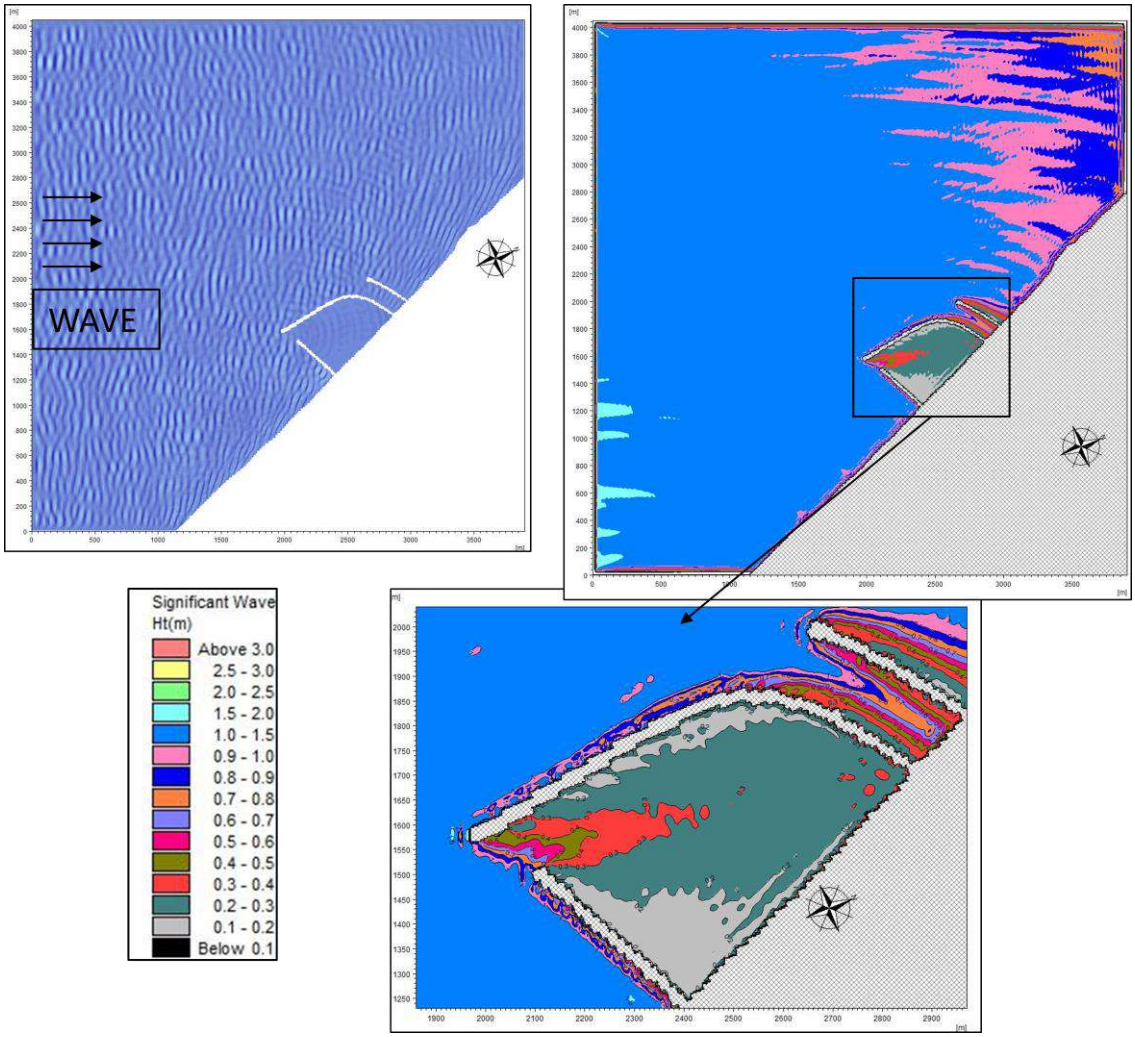


Figure 14: Wave propagation and height distribution for critical waves under Scenario-1

4.5 Model Operation with Scenario-2 *(by 75m Curtailment of Northern Breakwater)*

To simulate the wave propagation with Scenario-2 by 75m curtailment of northern breakwater, bathymetry is shown in Figure 15.

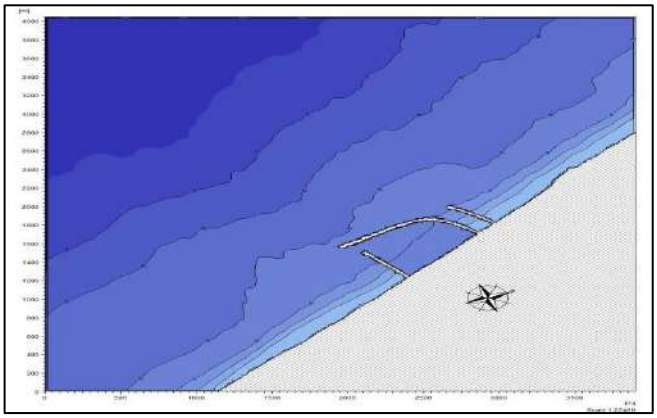


Figure 15 Bathymetry under Scenario-2 (revised layout with 75m curtailment of Northern breakwater)

The model is operated to simulate wave disturbance critical wave condition. The results are shown in Figure 16. From the figure, it could be seen that wave heights inside the basin are less than 0.3m. But near the harbor inlet, presence of wave heights ranging from 0.3m to 1.0m may create maneuverable problem to fishing vessels while entering into the harbour.

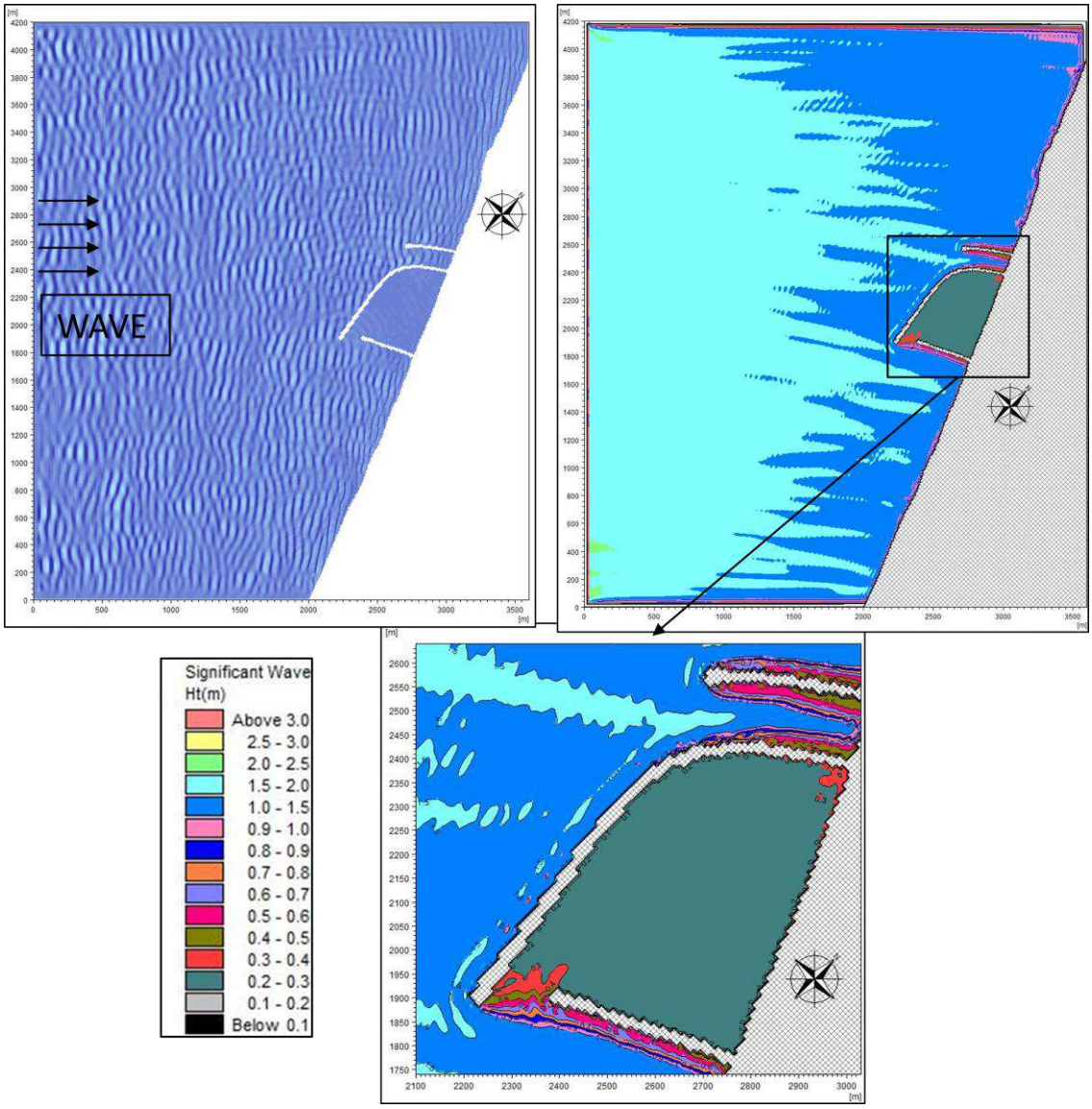


Figure 16 Wave propagation and height distribution in harbour under Scenario-2

4.6 Model Operation with Scenario-3 *(by 50m Curtailment of Northern Breakwater)*

To simulate wave propagation with Scenario-3 having 50m curtailment of northern breakwater bathymetry was modified as depicted in Figure 17.

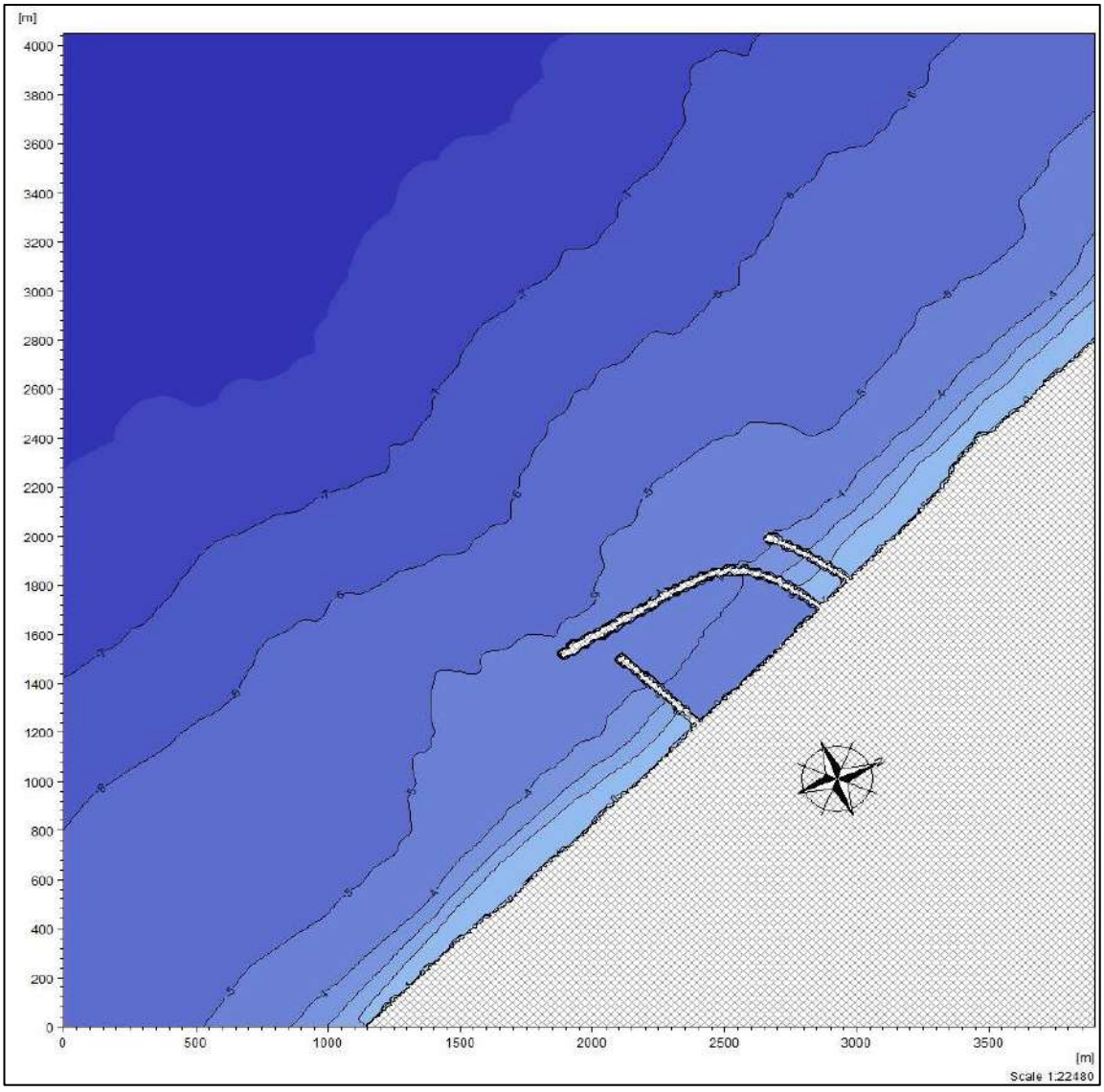


Figure 17 Bathymetry under Scenario-3 (revised layout with 50m curtailment of Northern breakwater)

The model is operated to simulate for critical wave condition and the results near the harbour are shown in Figure 18. From the figure, it could be seen that wave heights inside the basin are less than 0.3m. But in this case also at the entrance, wave heights ranging from 0.3m to 1.0m may create hindrance in maneuverability of fishing vessels while entering into harbor similar to earlier scenario (i.e. Scenario-2).

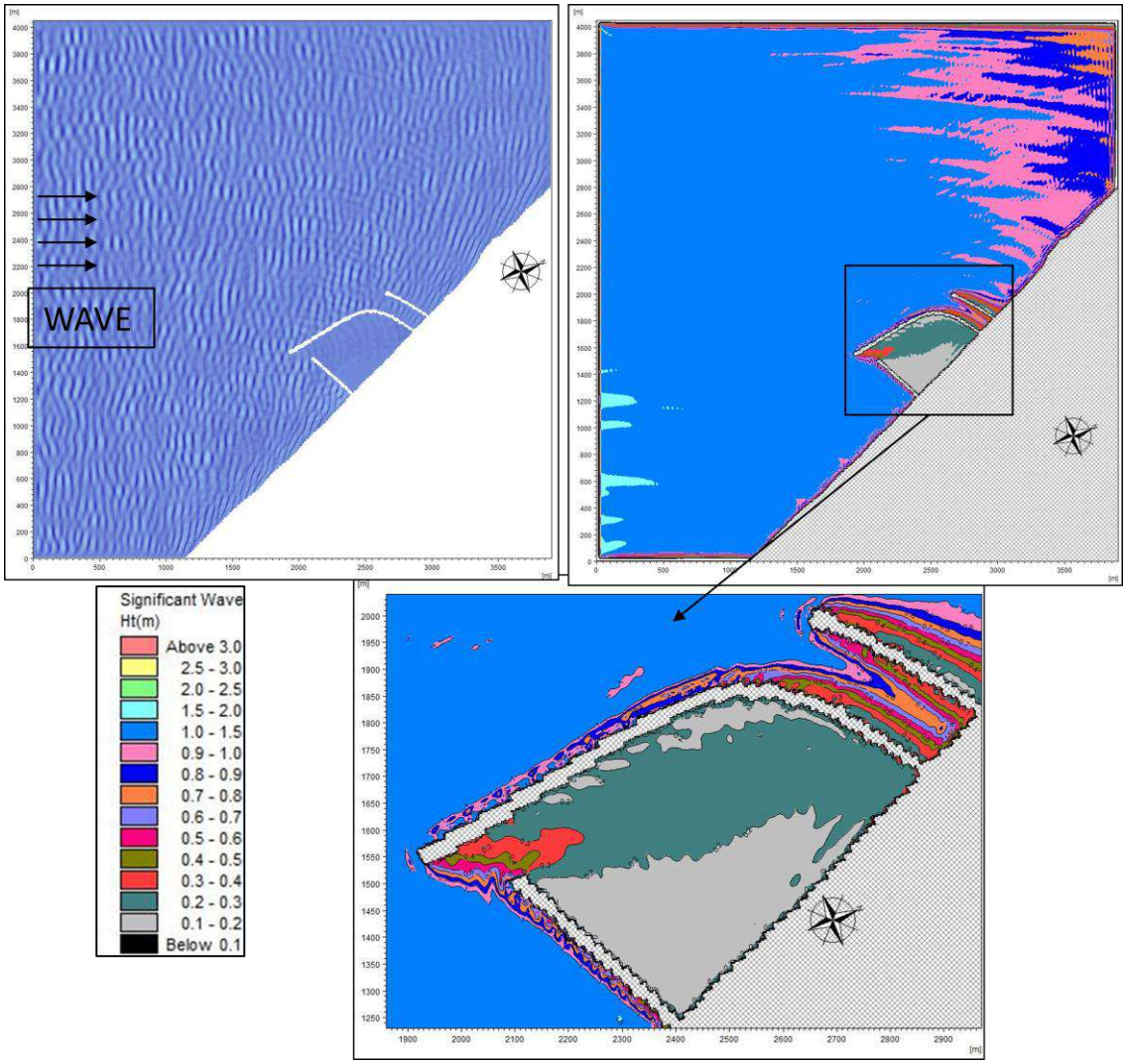


Figure 18 Wave propagation and height distribution in harbour under Scenario-3

5. CONCLUSIONS

I. Input wave conditions for wave tranquility studies are derived from MIKE21BW model. Wave models are simulated for the revised layout and for three different scenarios by curtailment of northern breakwater by 100m, 75m and 50m respectively. With respect to harbour entrance wave incident from SSW is found to be critical.

Incident Wave Direction	Incident Wave Height
SSW (critical direction)	1.5
SW	2.0
WSW	2.5
WEST	2.5
WNW	1.5

II. For the revised layout, wave heights in the harbor basin in all wave conditions are observed to be less than 0.3m which satisfies the criteria of tranquility limit. With this layout, the proposed harbour would be operational throughout the year.

III. With curtailment of north breakwater by 100m (Scenario-1) wave heights inside the basin are more than 0.3m. This layout is not suitable from wave tranquility point of view.

IV. With curtailment of North breakwater by 75m (Scenario-2) and 50m (Scenario-3), though wave heights inside the basin are less than 0.3m but at the entrance of the harbour wave heights are found to be in the range from 0.3m to 1.0m which may create difficulty in maneuvering to fishing vessels during entering into harbour.

V. The above statistics is based on ship observed visual wave data. These data are observed through ships. During stormy conditions ships try to avoid storm track, therefore these data do not contains storm data. Therefore operational days would be considered without storm. However, storms would be treated as non-operational days.

References

1. CWPRS Technical Report No. 5436 (November 2016) – Wave propagation studies to determine wave climate for the development of fish landing facilities at Ajanur, District kasargod ,Kerala
2. CWPRS Technical Report No. 5357 (February 2016) – Mathematical model studies for littoral drift and shoreline evolution due to the proposed fishery harbor at Ajanut, Dist. Kasargod, Kerala

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MATHEMATICAL MODELLING FOR COASTAL ENGINEERING DIVISION
(Coastal and Offshore Engineering Laboratory)

TECHNICAL REPORT No.: 6283
July 2024

मछली पकड़ने के बंदरगाह के निर्माण के कारण जल-गत्यात्मकता और गाद का आकलन करने के लिए गणितीय प्रतिमान अध्ययन अजनूर, केरल

MATHEMATICAL MODEL STUDIES TO ASSESS HYDRODYNAMICS AND SILTATION DUE TO CONSTRUCTION OF FISHING HARBOUR AT AJANUR, KERALA

Dr. R. S. Kankara
Director

REPORT DOCUMENTATION SHEET

Technical Report No. 6283 **Date: July 2024**

Title: MATHEMATICAL MODEL STUDIES TO ASSESS HYDRODYNAMICS AND SILTATION DUE TO CONSTRUCTION OF FISHING HARBOUR AT AJANUR, KERALA

Officers Responsible for Conducting the Studies

The studies were conducted by Boora Krishna, Scientist 'B', Dr. Naren Scientist 'B' and Naval Jagatap, Scientist 'B' under the supervision of Dr. Jiweshwar Sinha, Scientist 'E' and Dr. Prabhat Chandra, Additional Director and overall supervision of Dr. R. S. Kankara, Director, CWPRS, Pune.

Name and Address of Organization Conducting the Studies

Mathematical Modelling for Coastal Engineering Division
Central Water and Power Research Station, Pune - 411 024

Name and Address of Authority Sponsoring the Studies

Chief Engineer,
Harbour Engineering Department (HED),
Kamaleshwaram, Manacaud - P.O, Thiruvanathapuram – 695 009

Synopsis

Mathematical model studies to assess hydrodynamics and sedimentation aspects for the proposed development of fishing harbour at Ajanur was referred to CWPRS by Chief Engineer, HED, Kerala. The model simulations for hydrodynamics and sedimentation were carried out for the existing and the proposed condition.

As per the wave and littoral drift simulation results the proposed layout having 1150m long north breakwater, 425m long south breakwater, 435m breakwater as a river training work was studied for hydrodynamics and siltation point of view. Further, dredging upto -2m in the approach channel of the Chittari river mouth with appropriate dredging along the river was incorporated in the model. Also, dredging upto -4m in the harbour basin was considered in the hydrodynamic model simulations. The model results revealed that the annual sedimentation i.e. depth of deposition for the proposed condition in the harbour basin would be about 0.03m per year whereas depth of deposition at the river mouth would be about 0.045m in a year. A reduction in current speed due to the proposed development in the channel i.e. dredging of the channel up to -2m as well as in the proposed harbour basin would cause the loss of depth in the site. Further, an annual sedimentation of about 0.05m along the north and south of the breakwaters is also observed from the model results. Based on the model results, the proposed layout of the training works and the harbour basin is found to be suitable with the prevailing conditions at the site.

Key Words: Mathematical Model, Breakwater, Current, Sedimentation, MIKE 21

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MATHEMATICAL MODEL STUDIES TO ASSESS HYDRODYNAMICS AND SILTATION DUE TO CONSTRUCTION OF FISHING HARBOUR AT AJANUR, KERALA

Technical Report No.:6283	DATE: July 2024

1.0 INTRODUCTION

Harbour Engineering Department (HED), Government of Kerala proposed to develop a fishing harbour at Ajanur situated about 15km south of Kasaragod district. Ajanur fishing harbour is located geographically at Latitude 12.33^0 N and Longitude 75.18^0 E in Kerala state on the western coast of India. Fig. 1 shows the location map of Ajanur fishing harbour.

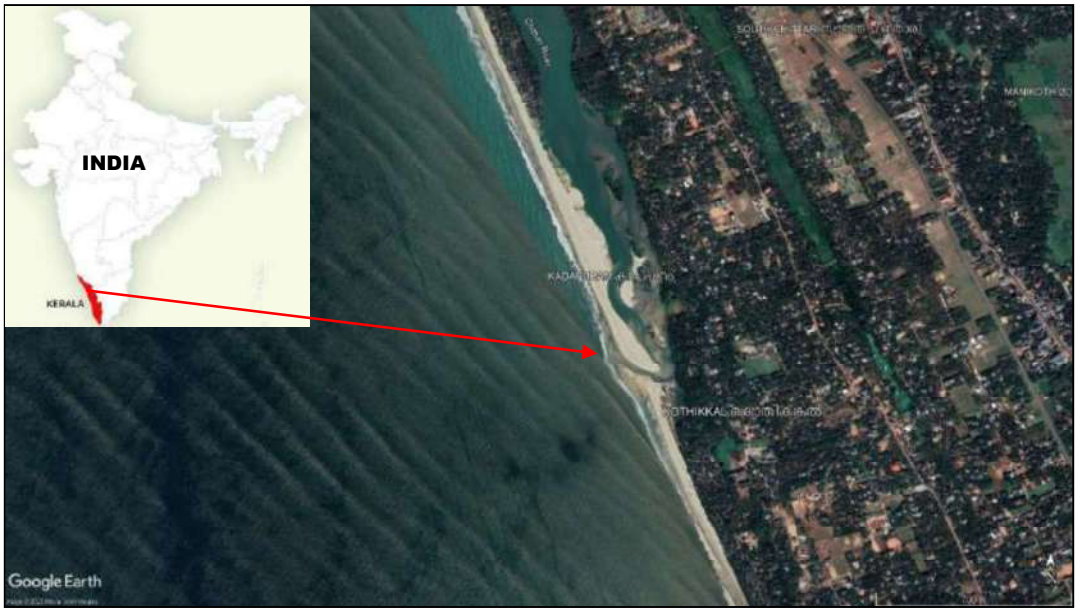


Figure 1: Location of Site at Ajanur

CWPRS carried out wave model studies on the same study area in the year 2016. These studies proposed one final layout of fishing harbour. As per the CWPRS 2016 report vide T. R. No. 5436, Nov 2016, the harbour basin area is about 19 hectares. Considering the future expansion as suggested by the Technical Sanction Committee of Pradhan Mantri Matsya Sampada Yojana (PMMSY) scheme vide HED Letter No. D4/9509/06/CE dated 16-06-2022, HED proposed a revised layout of the Ajanur fishing harbour. The revised layout consists of 1150m long north breakwater, 425m long south breakwater and 435m breakwater as a river training work near the mouth of Chittari river. River training work is proposed in the present layout considering two major coastal processes: - (i) control of shifting and closing of Chittari River mouth due to sedimentation (ii) Southward littoral drift and littoral zone consideration (from CWPRS study T. R. No 5357 Feb 2016). The revised layout is shown in Fig. 2.

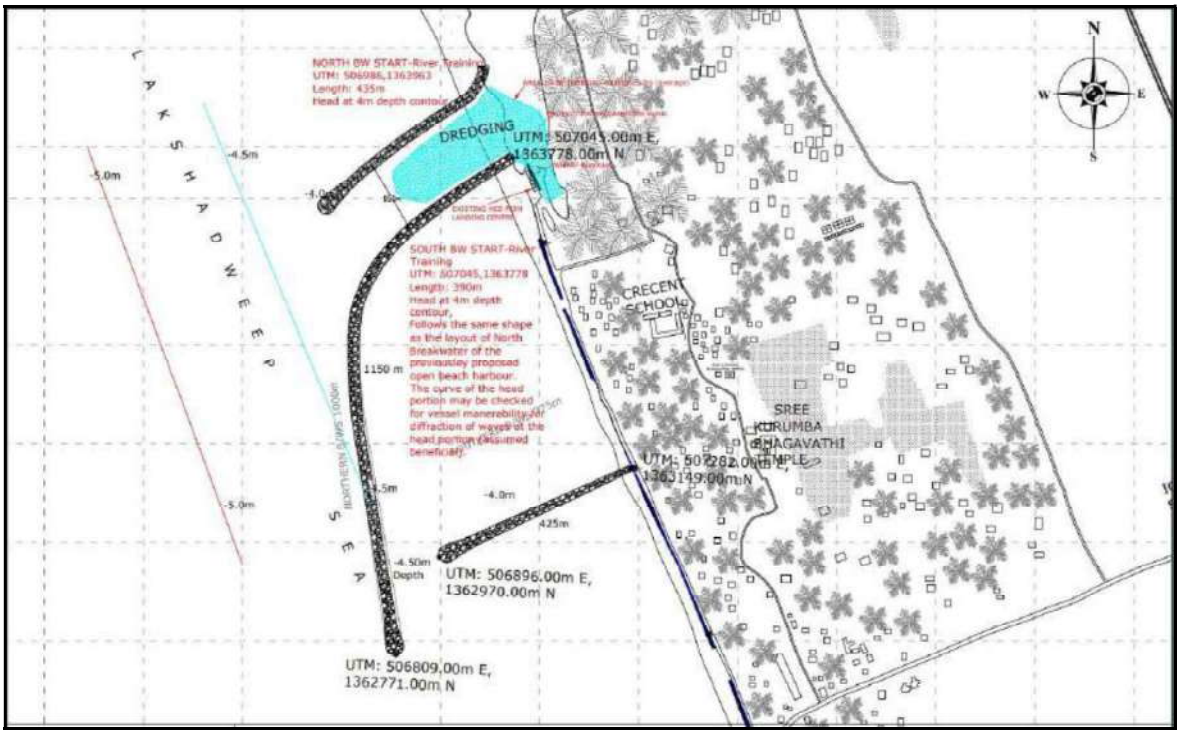


Figure 2: Proposed Layout at Ajanur

2.0 SCOPE OF STUDIES

Mathematical model studies to assess the hydrodynamics and siltation due to the proposed construction of fishing harbour are undertaken.

Following are the objectives of the present studies:

(i) To study the hydrodynamics and siltation with the existing condition.

(ii) To study the changes in hydrodynamics and siltation with the proposed condition wherein fishing harbour layout and river training work are included.

3.0 DATA ANALYSIS

The data required for the model studies are bathymetry of the area, tidal data, grain size distribution, suspended sediment concentration, river discharge, if any etc. HED, Kerala, the Project Authority (PA) has conducted field survey to collect the aforementioned data during March 2023. Earlier, PA conducted survey to collect the data in the year 2022 (1st June to 7th June). After examining the data, it was found that the data was not appropriate for numerical modelling. Hence, a re-survey for collecting the data were conducted by PA between 15th March to 20th March 2023. The data is collected both in river region (Lat:12.347, Lon 75.062) and in offshore region (Lat: 12.334 Lon: 75.0611). Henceforth, in this report these two points are called as P1 and P2 respectively as per Fig. 3. The details of the data collected are discussed below.

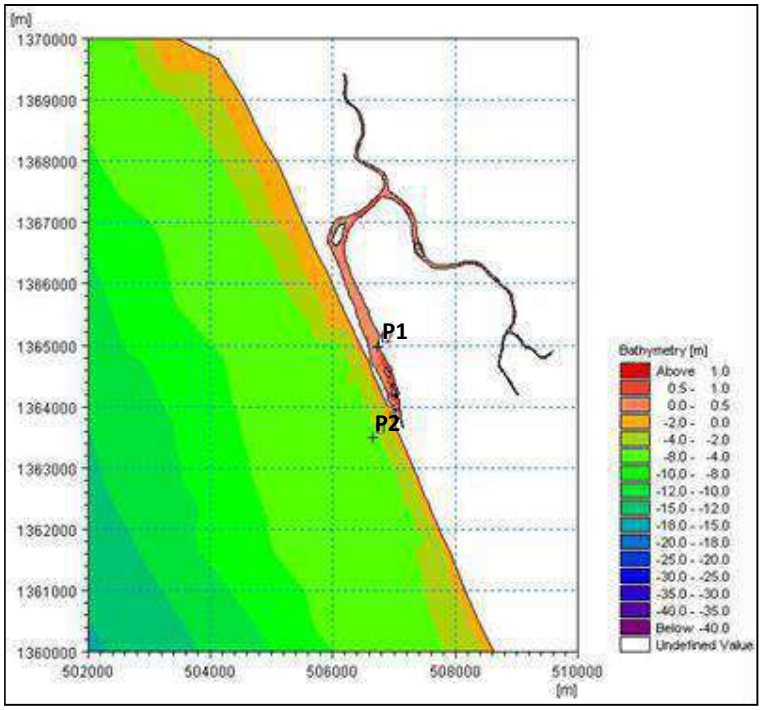


Figure 3: Field data collection points

3.1 Bathymetry

The bathymetric data for offshore shore region is obtained from C-MAP data. The nearshore bathymetry data is obtained from the hydrographic charts supplied by PA. The Acoustic Doppler Current Profiler (ADCP) of CWPRS is used to obtain the data of water level depth over the estuary and river region. The water level depth measurements are further used to estimate the bathymetry. The estimated bathymetry used in this study is shown in Fig 4.

3.2 Tides

Tidal data is collected from 15th March 2023 to 20th March 2023 at two different locations i.e., river (P1: Lat:12.347, Lon 75.062) and over sea region (P2: Lat: 12.334 Lon: 75.0611) as mentioned above. The tide data obtained at P1 and P2 w.r.t Mean Sea Level (MSL) is shown in Fig. 5. The MSL at Ajanur is 0.98m. It is observed that the spring tide tidal range (Global Tide) is about 1.30m. It is observed from the plot that tidal data at P1 is almost continuous with few missing values. However, the data at P2 is discontinuous not following usual tidal trends.

3.3 Tidal Currents

Field observed current data collected at locations P1 and P2 during March 2023 is shown in Fig 6. It is observed that the current data at both P1 and P2 shows numerous spikes at different time steps. Tide and currents data find importance in the study for calibrating the model.

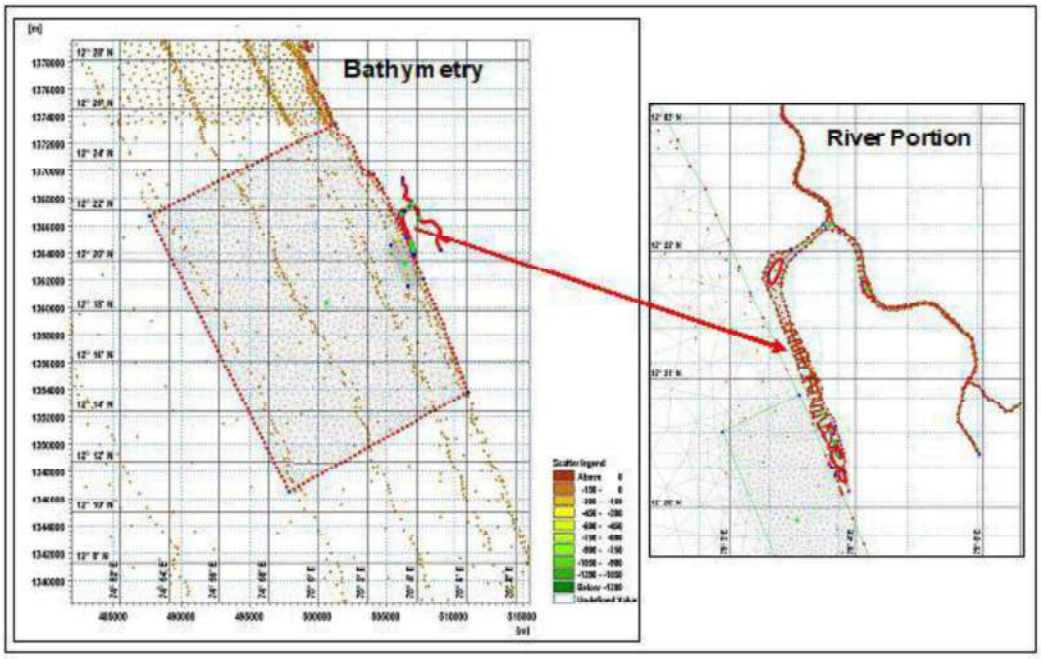


Figure 4: Bathymetry data

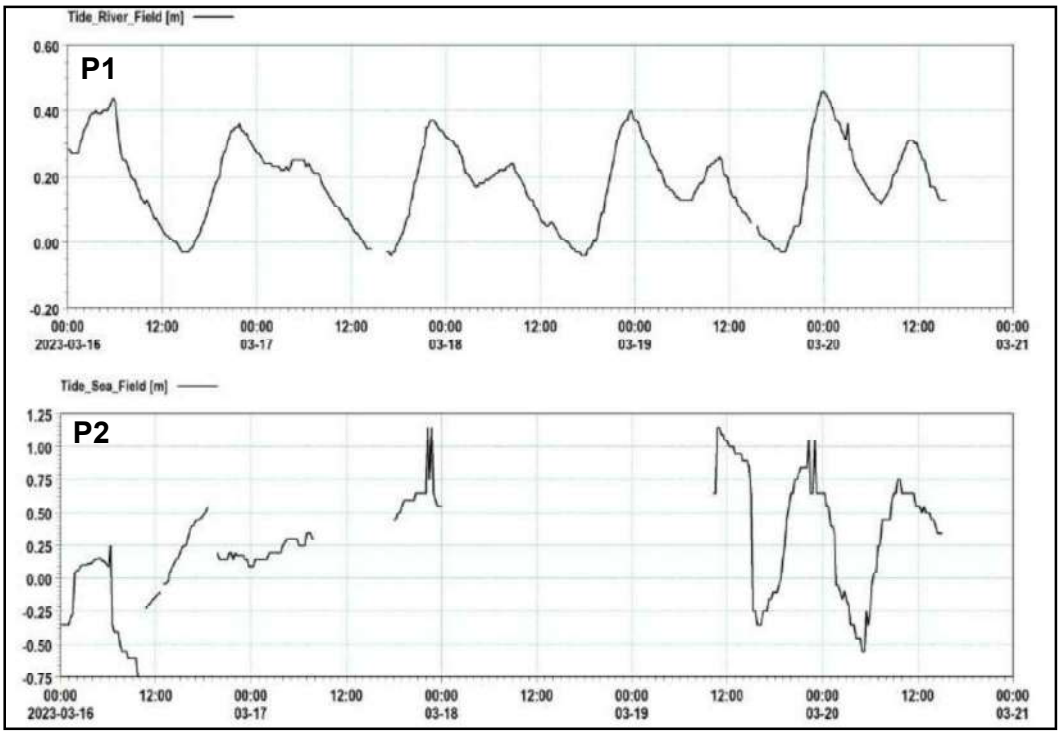


Figure 5: Observed tides at P1 and P2

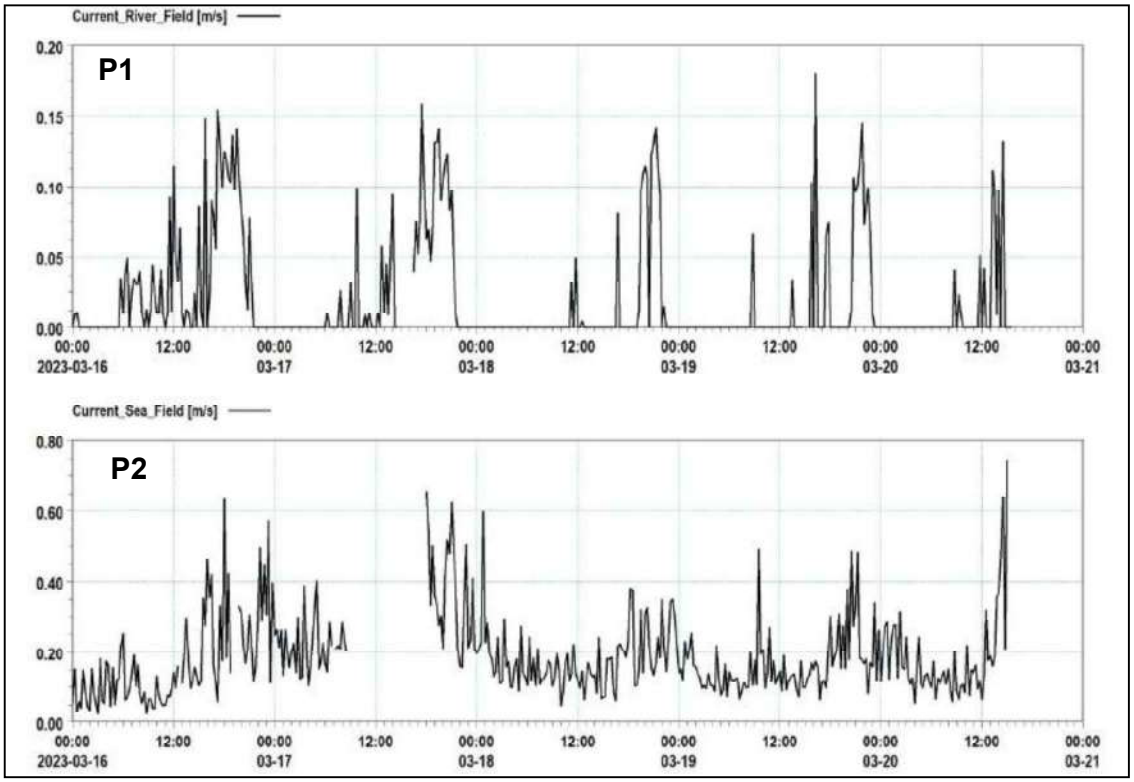


Figure 6: Observed current at P1 and P2

3.4 Sediment Data

The sediment data is collected and supplied by HED which comprised of the bed sample taken in the year 2022. The average D_{50} is 0.064mm in sea and D_{50} in river is 0.210mm.The grain size distribution at P1 and P2 is shown in Fig. 7. Water samples are collected at river and sea point (P1 and P2) during March 2023 to estimate the Suspended Sediment Concentration (SSC). From the data it is observed that SSC varies at P1 from 0.1mg/l to 0.15mg/l. Whereas, variation of SSC is between 0.05mg/l to 0.11mg/l at P2. The average suspended sediment concentration (SSC) in is 0.210mg/l and 0.08mg/l at P1 and P2 respectively. These average values of SSC are used for modelling.

3.5 Discharge Data

The river discharge is also a required parameter for calibrating the model. The river Chittari is a non-perennial river having variation in discharge during monsoon and non-monsoon seasons. As per HED, the river carries minimal discharge during monsoon and almost no discharge during the non-monsoon season. During the time period of field data collection, discharge in the river is only due to influence of tidal fluxes. The river discharge of 6 m^3/s is obtained through river ADCP observations is considered for non-monsoon season and for monsoon season, 25 m^3/s discharge is considered for modelling.

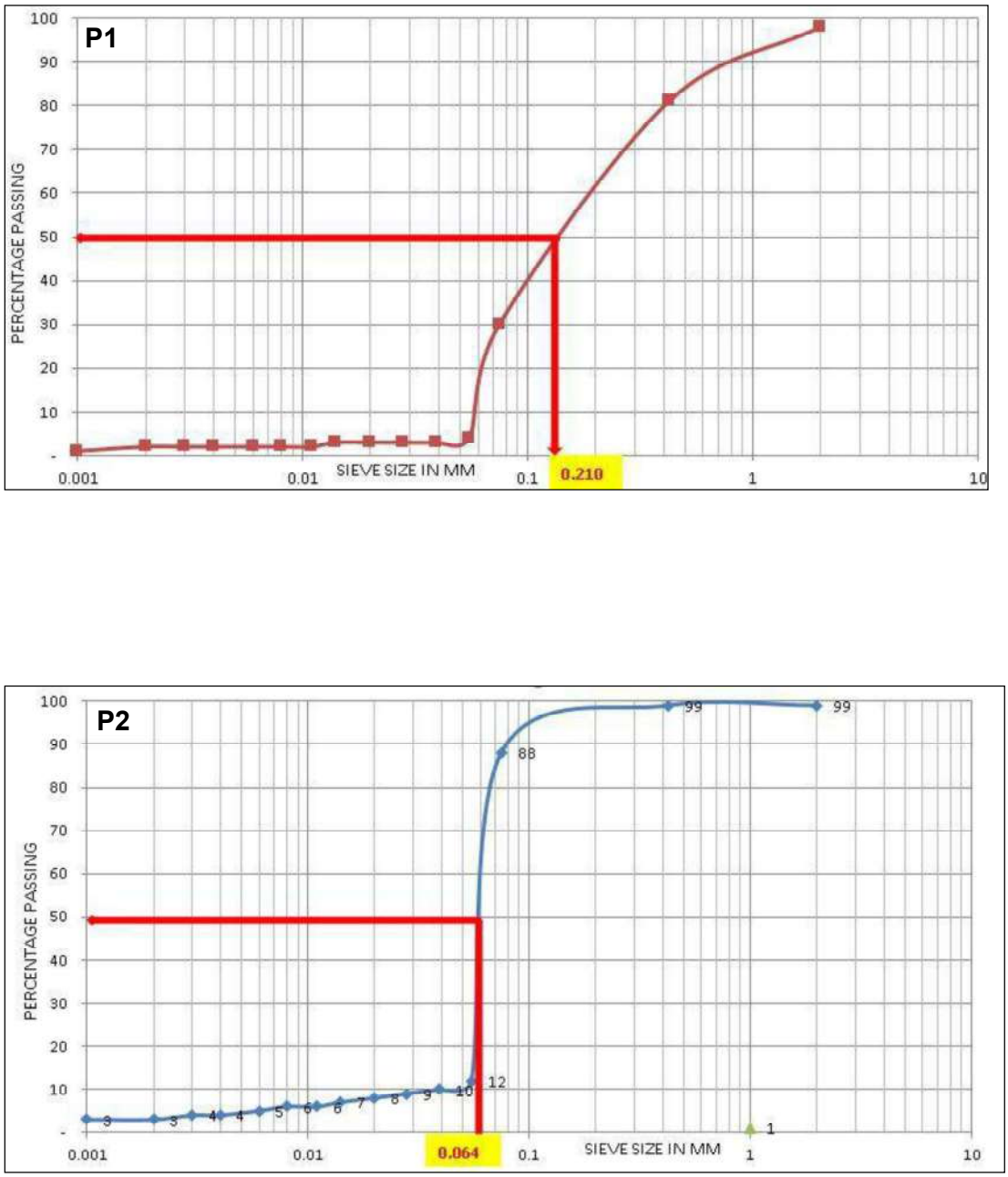


Figure 7: Grain size distribution at P1 and P2

Table 1: Details of suspended sediments concentration at P1 and P2

P1				P2			
Sample no.	Date	Time	Suspended solids in mg/l	Sample no.	Date	Time	Suspended solids in mg/l
W1	15/03/2023	7.00pm	0.12	W1	15/03/2023	10.30am	0.07
W1	16/03/2023	8.00 am	0.13	W2	15/03/2023	7.45pm	0.06
W2	16/03/2023	2.00pm	0.1	W1	16/03/2023	3.00pm	0.07
W3	16/03/2023	8.00pm	0.11	W1	17/03/2023	8.00am	0.07
W1	17/03/2023	8.00am	0.14	W2	17/03/2023	8.15pm	0.07
W2	17/03/2023	2.00pm	0.15	W3	17/03/2023	2.00pm	0.11
W3	17/03/2023	8.00pm	0.11	W4	17/03/2023	2.30pm	0.11
W1	18/03/2023	8.00am	0.13	W5	17/03/2023	8.00pm	0.09
W2	18/03/2023	2.00pm	0.11	W1	18/03/2023	8.00am	0.06
W3	18/03/2023	7.00pm	0.13	W2	18/03/2023	1.30pm	0.08
W1	19/03/2023	8.00am	0.1	W3	18/03/2023	9.00pm	0.05
W2	19/03/2023	2.00pm	0.12	W1	19/03/2023	8.00am	0.08
W3	19/03/2023	8.00pm	0.1	W2	19/03/2023	3.00pm	0.1
W1	20/03/2023	7.00am	0.11	W1	20/03/2023	8.30am	0.09
W2	20/03/2023	2.00pm	0.1	W2	20/03/2023	1.00pm	0.07

4.0 METHODOLOGY

The mathematical model studies are carried out using MIKE 21 software using the Flexible Mesh. The flexible mesh is considered as suitable for creeks with meandering coastline. The hydrodynamic studies include simulation of the flow field for the following conditions: -

1. Calibration of the model with the existing site conditions of the year 2023.
2. In the proposed condition, the layout as shown in Fig. 2 is studied for assessment of changes in the hydrodynamics and sedimentation.

The model run to evaluate hydrodynamics would be calibrated with the observed field data along with wave induced currents (radiation stresses) from wave model studies. The calibrated model will be used to predict the changes in the flow pattern for the proposed condition. The results of the above hydrodynamic studies are used as basic input for the sediment transport studies.

Model studies are carried out by coupling the flow models with sedimentation models to predict the evolving changes in sedimentation pattern. The results of these studies show the spatially varying pattern of siltation and erosion. The simulation of hydrodynamics and sedimentation (for existing and proposed condition) is separately performed for monsoon and non-monsoon seasons. The comprehensive detail of the hydrodynamics, wave and siltation studies for both existing and proposed condition is useful information for the coastal population and also the policy makers.

5.0 DESCRIPTION OF MODULES OF MIKE 21 FM

The 2-dimensional hydrodynamic model MIKE 21 HD, Flexible Mesh is used for simulating the flow field in the model domain and MIKE 21 MT for the sediment transport studies in the existing and the proposed scenario under prevailing tidal and wave conditions. The brief description of scientific background of MIKE 21 HD and MIKE 21 MT is given below.

5.1 MIKE-21 HD MODULE:

For any major developments in coastal areas, it is necessary to know dynamics of the water body in terms of velocity and water level fluctuations beforehand. The appropriate governing equations for studying water movement in coastal areas are the two-dimensional shallow water equations. These shallow water equations are obtained by vertically integrating the 3-Dimensional incompressible Reynold's averaged Navier- Stokes equations of motion over depth $h = \eta + d$ with the following simplified assumptions.

- The flow is incompressible,
- The flow is well mixed (no variation in density)
- Vertical accelerations are negligible,
- Bed stress can be modeled.

$$\frac{\partial h}{\partial t} + \frac{\partial h\bar{u}}{\partial x} + \frac{\partial h\bar{v}}{\partial y} = hS \qquad (1)$$

$$\frac{\partial h\bar{u}}{\partial t} + \frac{\partial h\bar{u}^2}{\partial x} + \frac{\partial h\overline{vu}}{\partial y} = f\bar{v}h - gh\frac{\partial \eta}{\partial x} - \frac{h}{\rho_0}\frac{\partial p_a}{\partial x} - \frac{gh^2}{2\rho_0}\frac{\partial \rho}{\partial x} + \frac{\tau_{sx}}{\rho_0} - \frac{\tau_{bx}}{\rho_0} -$$

$$\frac{1}{\rho_0}\left(\frac{\partial s_{xx}}{\partial x} + \frac{\partial s_{xy}}{\partial y}\right) + \frac{\partial}{\partial x}(hT_{xx}) + \frac{\partial}{\partial y}(hT_{xy}) + hu_sS \qquad (2)$$

$$\frac{\partial h\bar{v}}{\partial t} + \frac{\partial h\bar{v}^2}{\partial x} + \frac{\partial h\overline{uv}}{\partial y} = f\bar{u}h - gh\frac{\partial \eta}{\partial y} - \frac{h}{\rho_0}\frac{\partial p_a}{\partial y} - \frac{gh^2}{2\rho_0}\frac{\partial \rho}{\partial y} + \frac{\tau_{xy}}{\rho_0} - \frac{\tau_{by}}{\rho_0} -$$

$$\frac{1}{\rho_0}\left(\frac{\partial s_{yx}}{\partial x} + \frac{\partial s_{yy}}{\partial y}\right) + \frac{\partial}{\partial x}(hT_{xy}) + \frac{\partial}{\partial y}(hT_{yy}) + hv_sS \qquad (3)$$

The over bar indicates a depth average value for example, $\bar{u}$ and $\bar{v}$ are the depth-averaged velocities defined by

$$h\bar{u} = \int_{-d}^{n} u dz\,, \qquad h\bar{v} = \int_{-d}^{n} v dz$$

The lateral stresses T_{ij} include viscous friction, turbulent friction and differential advection. They are estimated using an eddy viscosity formulation based on the depth average velocity gradients.

$$T_{xx} = 2A\frac{\partial \bar{u}}{\partial x} \qquad T_{xy} = A\left(\frac{\partial \bar{u}}{\partial y} + \frac{\partial \bar{v}}{\partial x}\right) \qquad T_{yy} = 2A\frac{\partial \bar{v}}{\partial y}$$

The following symbols are used in the equations:

t	:	Time
x and y	:	Cartesian co-ordinates
$h = \eta + d$	:	Total water depth
d	:	Still water depth
S_{xx}, S_{xy}, S_{yy}	:	Components of radiation stresses
$\tau_{xx}, \tau_{xy}, \tau_{yy}$	:	Shear stress components
ρ	:	Density of water
$\bar{u}\bar{v}$	:	Depth averaged velocities
η	:	Surface Elevation
g	:	acceleration due to gravity (m/s^2)
f	:	wind friction factor related to Coriolis parameter
p_a	:	Atmospheric pressure
ρ_0	:	Density of water
S	:	Magnitude of discharge due to point sources
u_s, v_s	:	velocities at point sources
$f = 2\Omega sin\Phi$	:	Coriolis parameter (Ω is the angular rate of revolution and φ the geographic Latitude)
A	:	Horizontal eddy viscosity

The governing equations are solved by using an element-centered finite volume method. The spatial domain is discretised into non-overlapping elements, which can be either triangular or quadrilateral. The time integration can be done by using first order explicit Euler method (referred to as the lower temporal order scheme) or by using second order Runge Kutta method (referred to as the higher temporal order scheme).

5.2 MIKE-21 MT MODULE

The sediment transport studies were carried out using MIKE 21 MT model. This model simultaneously solves hydrodynamic and sediment transport equations. The calibration of sediment transport model is difficult because morphological changes are too slow and temporal bed changes are too variable to measure anything significant for comparison. The sediment fluxes at various locations may differ and the following factors contribute for these variations:

- Unsteadiness of flow,
- Mixtures of sediment in suspension,
- Variability of supply of mobile sediment on the bed,
- Presence of sandy (non-cohesive) sediment,
- Omission of depth variation,
- Effect of wave stirring.

The erosion, transport and deposition of silt, mud and clay particles under action of currents and waves can be best described by the multi-layers mode of the mud transport module of MIKE 21. The sediment transport module is dynamically coupled with the 2-dimensional hydrodynamic module, MIKE 21 HD. The module solves the primitive equations in two dimensions using finite difference methods by Alternating Direction Implicit technique and the Double Sweep algorithm. Following are the relationships used in the module.

The sediment transport formulations are built into the advection-dispersion module, MIKE 21 AD, which solves advection-dispersion equation:

$$\frac{\partial c}{\partial t}+u\frac{\partial c}{\partial x}+v\frac{\partial c}{\partial y}=\frac{1}{h}\frac{\partial}{\partial x}\left(hD_x\frac{\partial c}{\partial x}\right)+\frac{1}{h}\frac{\partial}{\partial y}\left(hD_y\frac{\partial c}{\partial y}\right)+Q_L C_L\frac{1}{h}-S \qquad (4)$$

The following symbols are used in the equation:

c	:	compound concentration (arbitrary units)
u,v	:	horizontal velocity components in x, y directions (m/s)
h	:	water depth (m)
Dx,Dy	:	dispersion coefficients in the x,y directions (m2/s)
S	:	accretion/erosion term (kg/m3/s)
QL	:	source discharge per unit horizontal area (m2/s/m2)
CL	:	concentration of source discharge (kg/m3)

The advection-dispersion equation is solved using an explicit, third-order finite difference scheme, and known as the ULTIMATE scheme.

6.0 MODEL STUDIES

The MIKE 21 HD module is used to study the hydrodynamics. For studying the sedimentation, MIKE 21 MT module is used. These modules are used for the existing and proposed layouts. The details of MIKE 21 HD and MIKE 21 MT modules used in this study are discussed below.

6.1 Computational Model

The spatial extent of computational model considered for model simulations is 16km (cross-shore) X 22km (along the shore). The computation model with its offshore and onshore boundaries is shown in Fig. 8. The Chittari river discharging into the ocean is considered to a certain extent in the computation model as shown in Fig. 8.

All oceanographic features of the study region in existing condition are incorporated in the computational model. The complete study area was discretised into computational unstructured mesh. The spatial resolution of the mesh is finer along the area of development (harbour area). Finer mesh resolution is adopted near harbour area in order to capture the variation in near shore tide and currents more accurately. The mesh resolution is coarser along the offshore boundary. The developed mesh showing the fine and coarser resolution in the computational model is shown in Fig. 9.

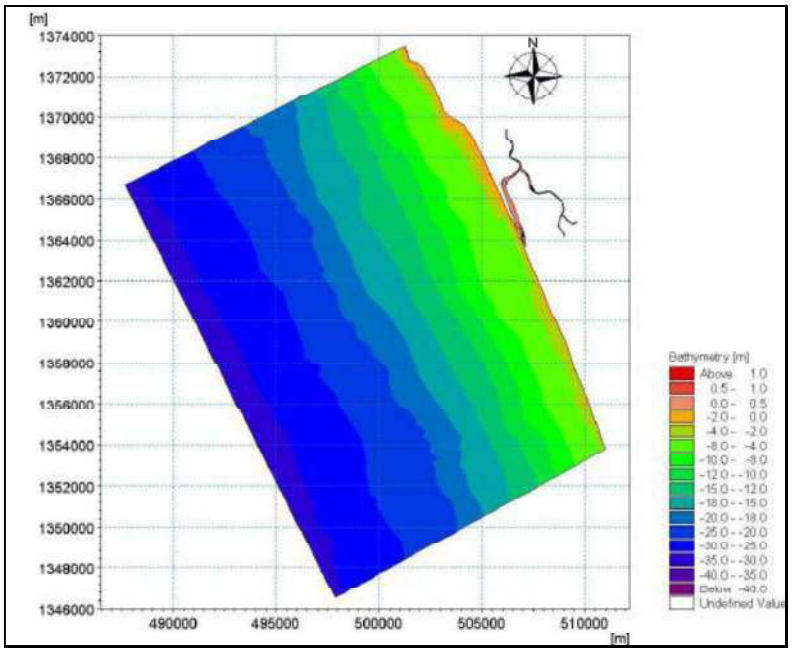


Figure 8: Computational model

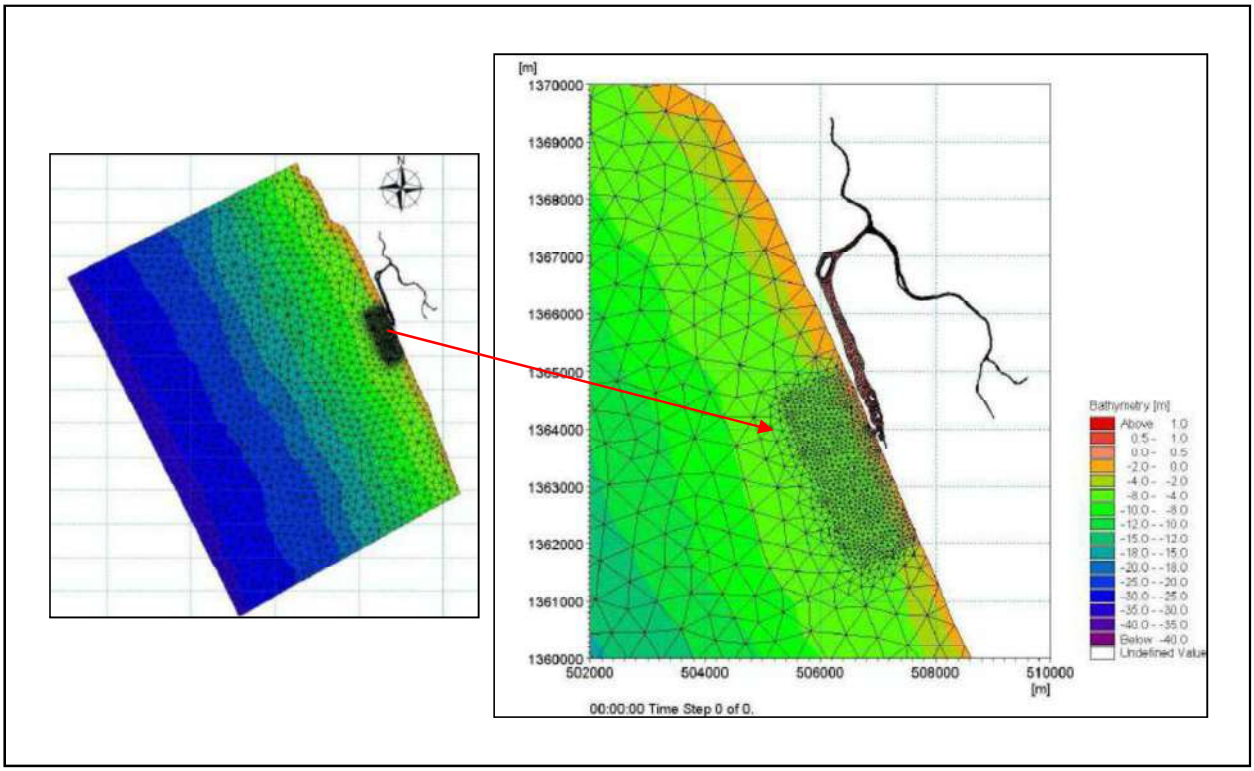


Figure 9: Computational mesh showing variable mesh resolution

6.2 Simulation of Flow Field – Existing condition- non-monsoon and monsoon seasons

Initially, flow field are modelled for the existing conditions for both non-monsoon and monsoon seasons. Defining boundary condition is essential for modelling the flow field. There are three offshore boundaries and one land boundary. The boundary tides are defined along these three offshore boundaries. The boundary tides obtained from MIKE 21 Global tidal model is used to define the boundary condition with phase lag. Further, discharge along the Chittari river is also given as another boundary condition. As the flow is assumed to be parallel to the contours along the western boundary, no-cross flux was considered in the west boundary in the open sea. Radiation stresses are also considered in the simulation to take into account the effect of wave induced currents. With these given forcings, MIKE 21 HD module is used to model the variation in tides and currents for a period of 15 days in non-monsoon (March 2023) and monsoon (July 2023) separately. The changes in flow fields are estimated every 30 minutes. Typical velocity vector plots during different phase of tides obtained during non-monsoon and monsoon seasons are shown from Fig. 10 to Fig. 13.

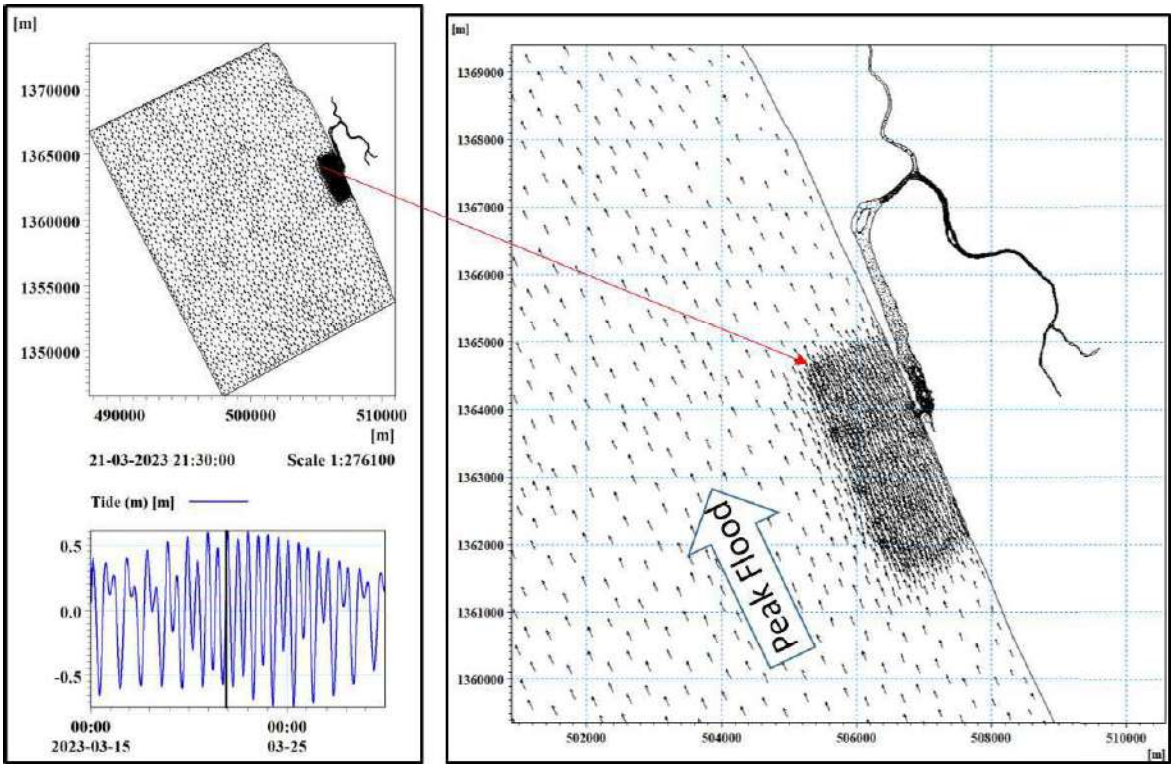


Figure 10: Flow field during peak flood-Non-monsoon season (Existing)

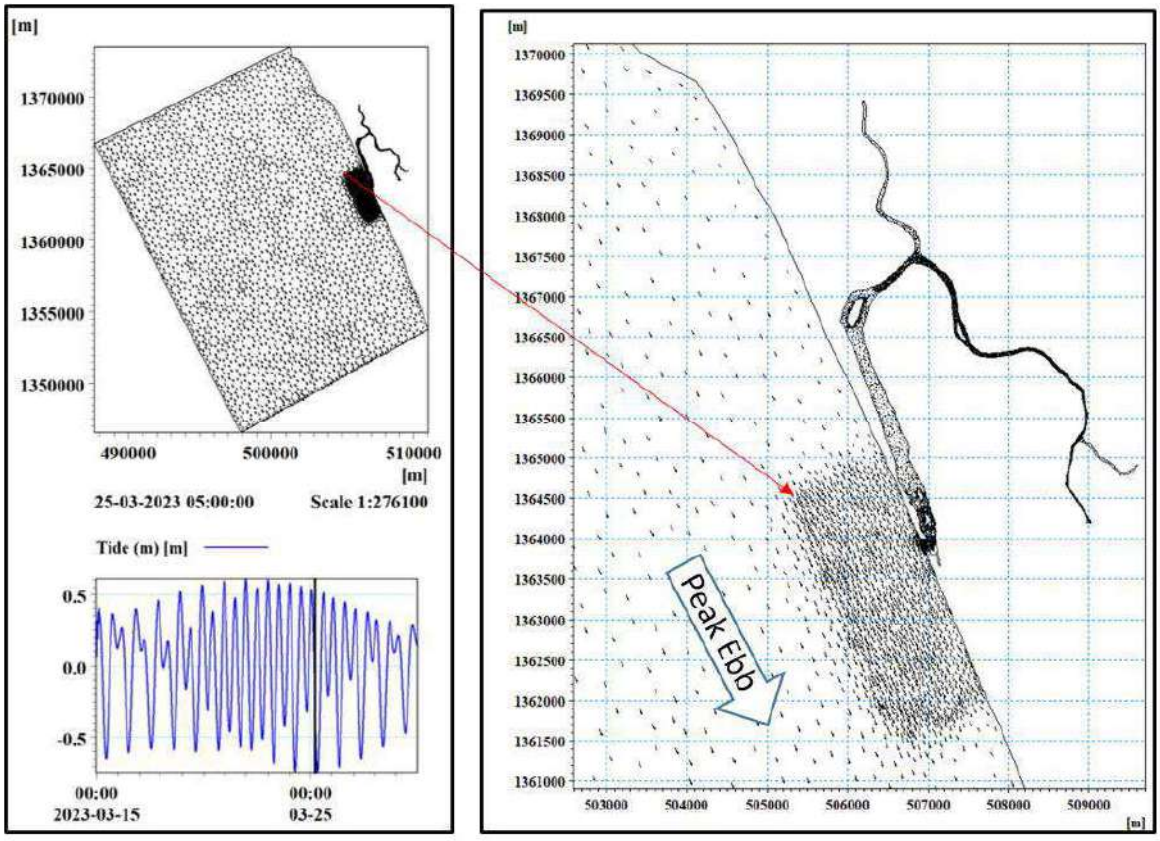


Figure 11: Flow field during peak ebb -Non-monsoon season (Existing)

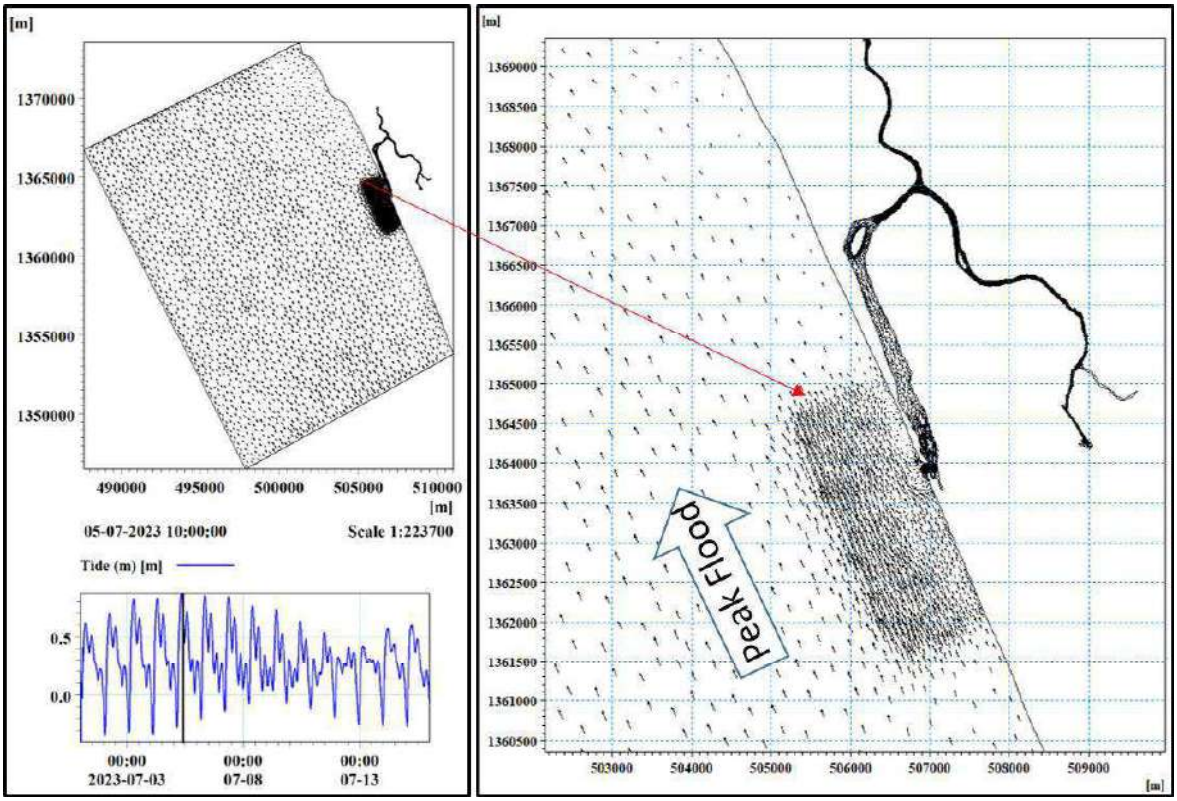


Figure 12: Flow field during peak flood- Monsoon season (Existing)

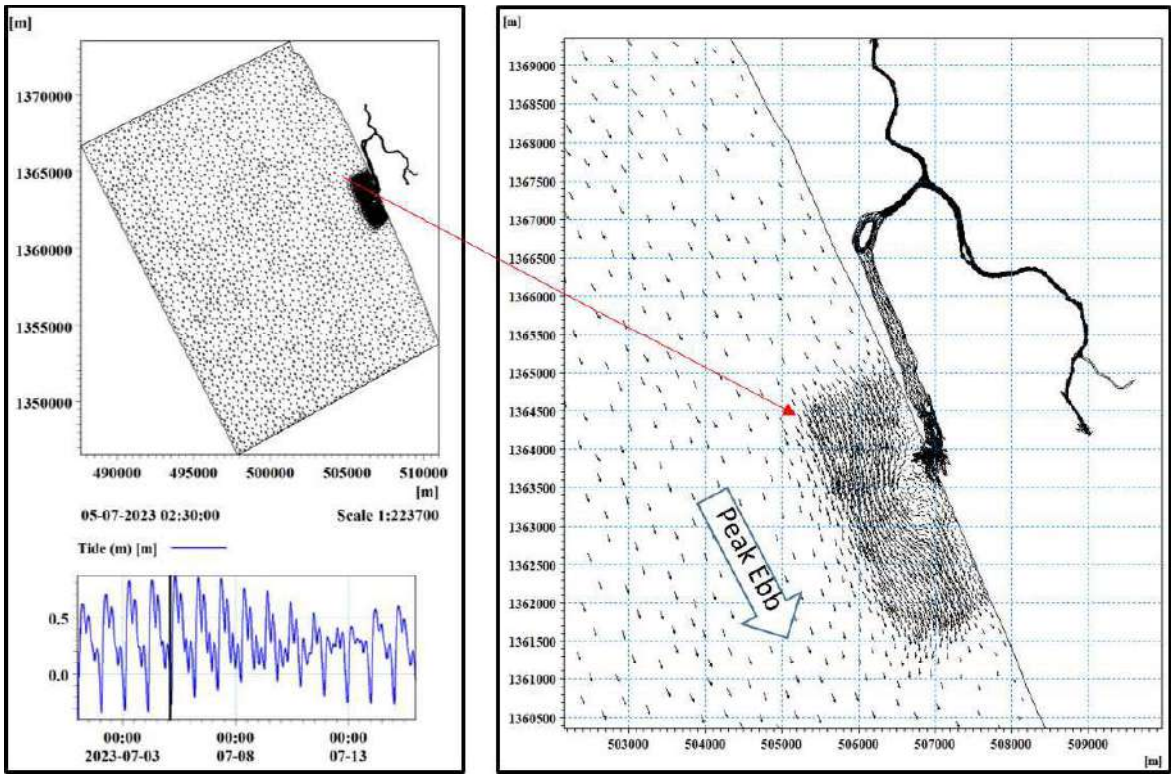


Figure 13: Flow field during peak ebb- Monsoon season (Existing)

The length of the vector gives magnitude of the current while the arrowhead shows the direction of flow. During peak flood, flow follows natural contour parallel to the coastal. The observed data of tides and current are provided at two points (P1 and P2) in the study area by the HED. Point P1 and Point P2 is located along the river and sea side of the computational domain respectively. The details of geographical location of P1 and P2 is discussed above in section 3. These two points are used for the purpose of comparison of modelled tides and currents against the observed values. The observed data of tides and currents at P1 and P2 are obtained during non-monsoon season only. The comparison of computed tides against the field values during non-monsoon season is shown in Fig. 14.

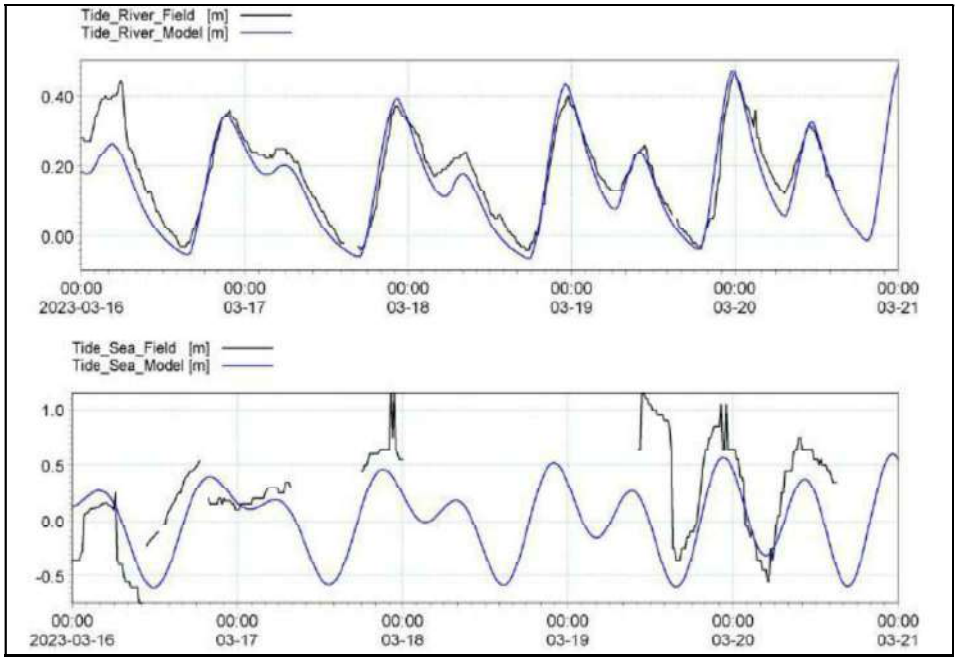


Figure 14: Comparison of tides (Field Vs Computed)

From the Fig.14, it is observed that there is good correspondence between the computed and field values of tides at the point P1. The good correspondence at P1 signifies the efficacy of model calibration. Due to the inherent ambiguity of the field current data at P1 and P2 provided by the PA, it is not possible to compare the computed values of currents at P1 and P2 against the field data. However, modelling results of currents shows that peak values of currents are captured more accurately by the model. Hence, there is good correspondence of computed peak current with the field peak currents. The peak of field current is 0.14m/s and peak of computed current obtained is 0.17m/s at P1. Similarly, at P2 peak of field current is 0.40m/s whereas peak of obtained computed current is 0.39m/s. The littoral drift and sediment pattern studies for the existing condition is discussed below

6.3 Littoral Drift Studies

Littoral drift studies are necessary for mapping the littoral distribution and changes in shoreline at the proposed location of fishing harbour. The littoral drift at this study area was carried out by CWPRS in the year 2016. The simulation results of the littoral studies were already reported vide Technical Report: - T.R. No. 5357 of 2016. The study reveal that annual southward and northward transports are 0.531Mm^3 and 0.118Mm^3 respectively with the net and gross transports being 0.413Mm^3 and 0.649Mm^3 respectively. Other findings of the study reveal that shoreline evolution in 10 years period will result in accretion on the northern side (68m in cross shore direction) and southern side (40m in cross-shore direction) of the proposed northern and southern breakwater respectively. This accretion and erosion is expected to extend further upto 2500m and 1500m towards along the shore towards north and south direction respectively. The shoreline evolution over the years for accretion and erosion is shown in Fig.15. Taking into consideration the influential role of silt and clay (mud) on sedimentation, in the present study, Mud Transport (MT) is modelled using MIKE 21 MT for identifying the spatially varying zones of sedimentation.

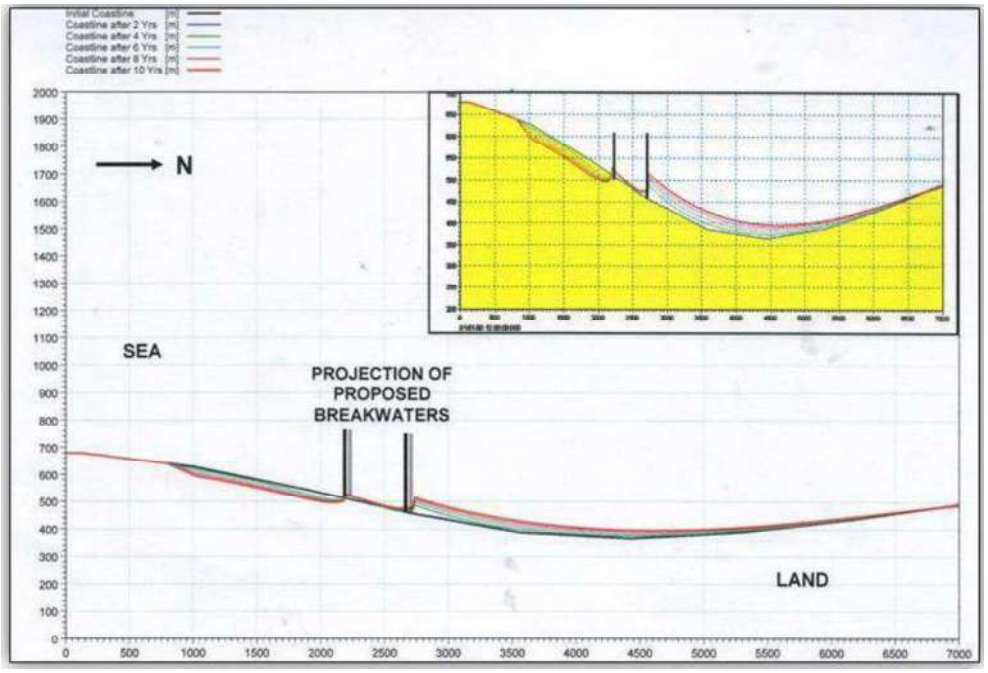


Figure 15: Shoreline evolution after 2nd,4th ,6th,8th and 10th year

6.4 Sedimentation Pattern - Existing Condition-non-monsoon and monsoon seasons

The sedimentation studies were carried out for the existing conditions for both non-monsoon and monsoon seasons using MIKE21 MT module. The results of hydrodynamic studies is one of the important inputs for sedimentation modelling using MIKE21 MT . Other inputs required are SSC and bed sample data in the study area. The data of SSC and bed sample are given by

HED for non-monsoon season. For monsoon season 50% increased SSC fraction of non-monsoon season is assumed to be adopted as input for sedimentation modelling. Using these inputs in the MIKE 21 MT model, sedimentation studies were carried out for the existing condition for a period of one month. The sedimentation patterns during non-monsoon and monsoon seasons are shown in Fig. 16 and Fig. 17 respectively. During monsoon period with the elevated discharge of Chittari River, flushing out of sediments deposited during non-monsoon period is observed. The estimated deposition (maximum) of about 0.1m in a year over the computational domain is obtained. The annual sedimentation estimated at the river mouth is about 0.021m for the existing condition.

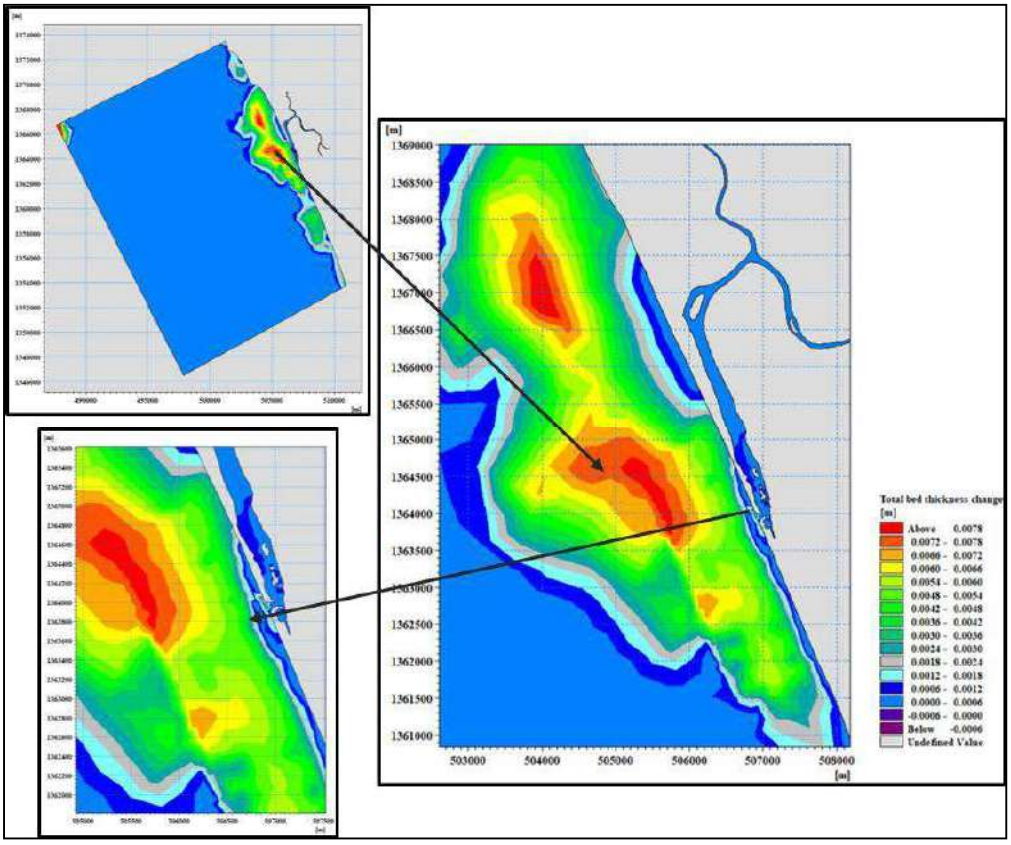


Figure 16: Sedimentation pattern during Non-monsoon season (Existing)

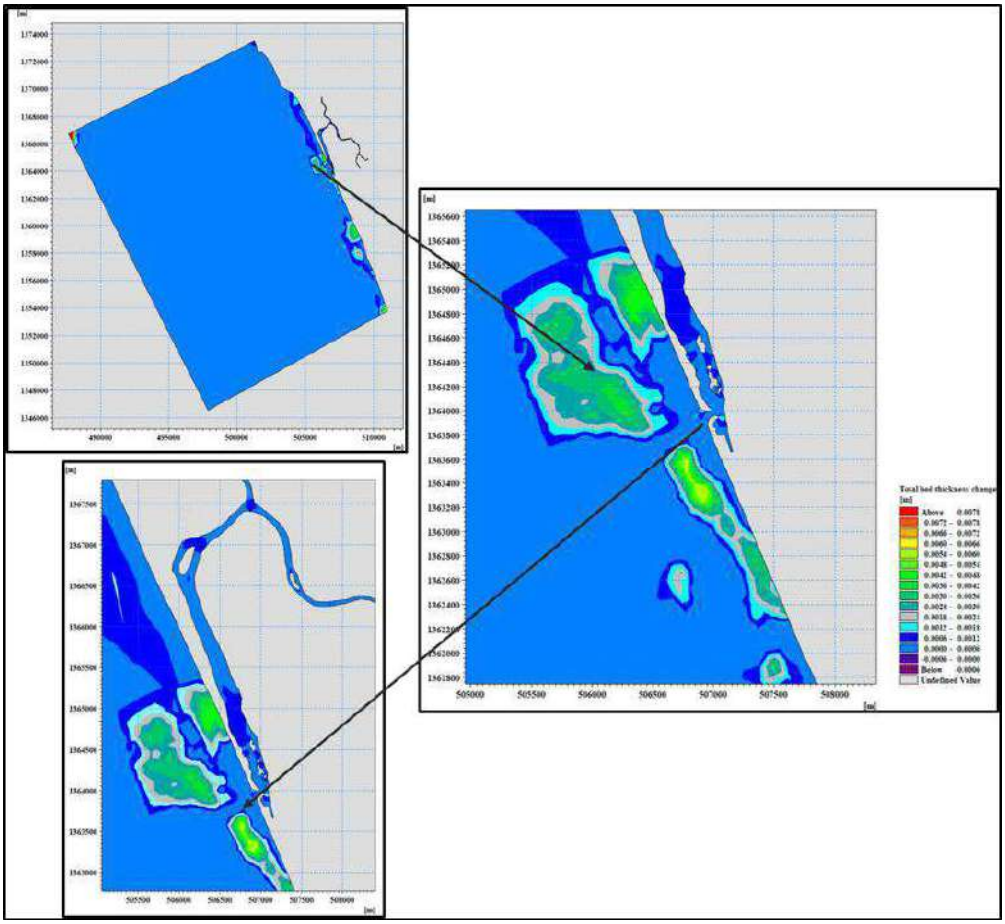


Figure 17: Sedimentation pattern during Monsoon season (Existing)

6.5 Simulation of Flow Field - Proposed Condition-non-monsoon and monsoon seasons

The calibrated model setup of existing condition was re-established by incorporating the features of the proposed layout. The layout consists of 1150m long north breakwater, 425m long south breakwater, 435m breakwater as a river training work & dredging (-2m) inside the approach channel nearer to the Chittari river mouth and suitable dredging along the river. The layout also consists of dredging of -4m inside the proposed fishing harbour. The bathymetry after re-establishing the proposed layout is shown in Fig. 18.

The computation domain with the unstructured mesh developed for the proposed layout is shown in Fig. 18. The mesh resolution considerations are the same as discussed in the section 6.1.

The flow is modelled during non-monsoon and monsoon seasons following the similar procedure and boundary condition constraints as adopted for simulating the flow conditions for the existing conditions. MIKE 21 HD module is again simulated to get the outputs of tides and currents for the proposed layout.

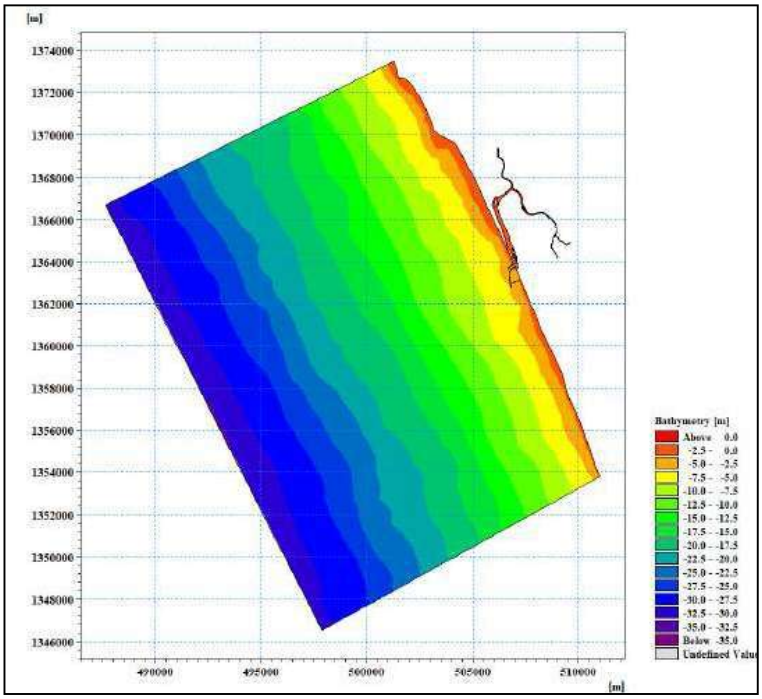


Figure 18: Bathymetry with proposed layout

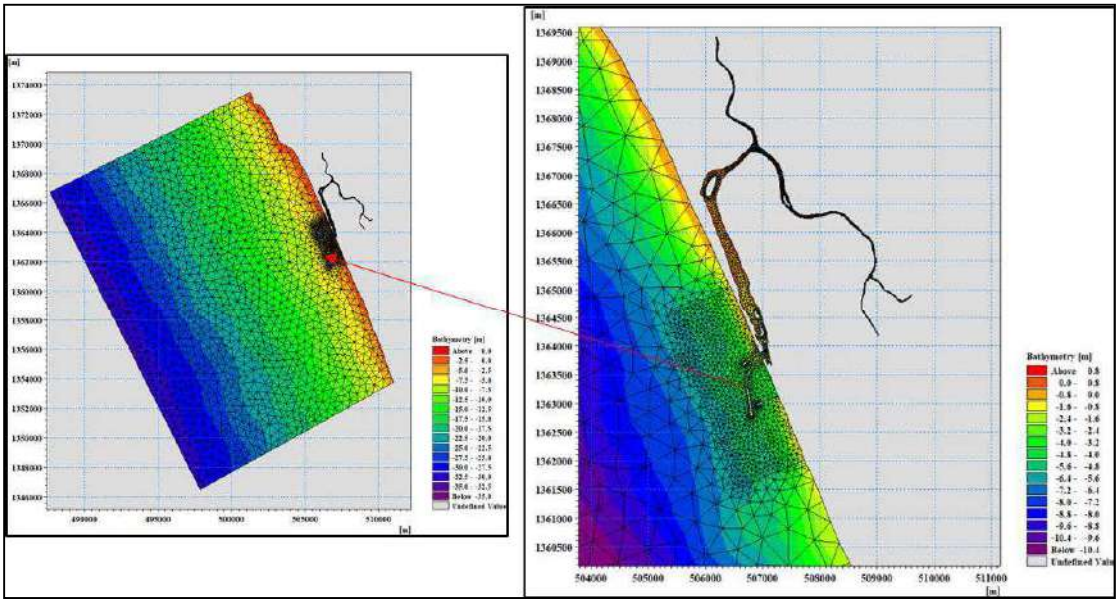


Figure 19: Computational domain for proposed layout

The flow fields along the model domain obtained for non-monsoon and monsoon seasons during peak flooding and ebbing tidal phases are shown from Fig. 20 to Fig. 23. During non-monsoon season, it is observed from the flow fields that circulation is formed near south breakwater during ebbing phase of tide. However, during monsoon season, circulation is formed near south breakwater (during flooding and ebbing phase of tide). In addition, during flooding phase, circulation is formed at 2 other locations (near north breakwater and entrance of river mouth) also. Though eddies formed around the circulation are weak, its intensity may

change according to changes in local climate. Furthermore, four points t1, t2, t3 and t4 called as monitoring stations are considered for assessment of changes in currents after construction of proposed layout. The locations of these four monitoring stations are shown in Fig. 24.

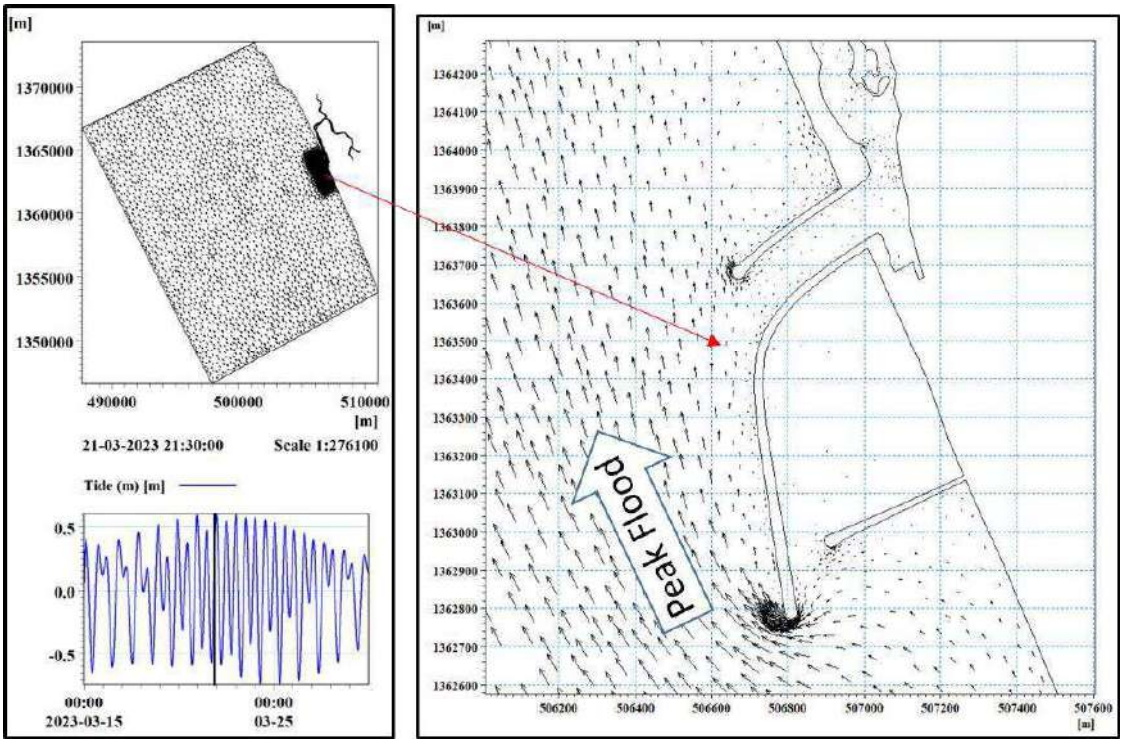


Figure 20: Flow field during peak flood-Non-monsoon season (Proposed condition)

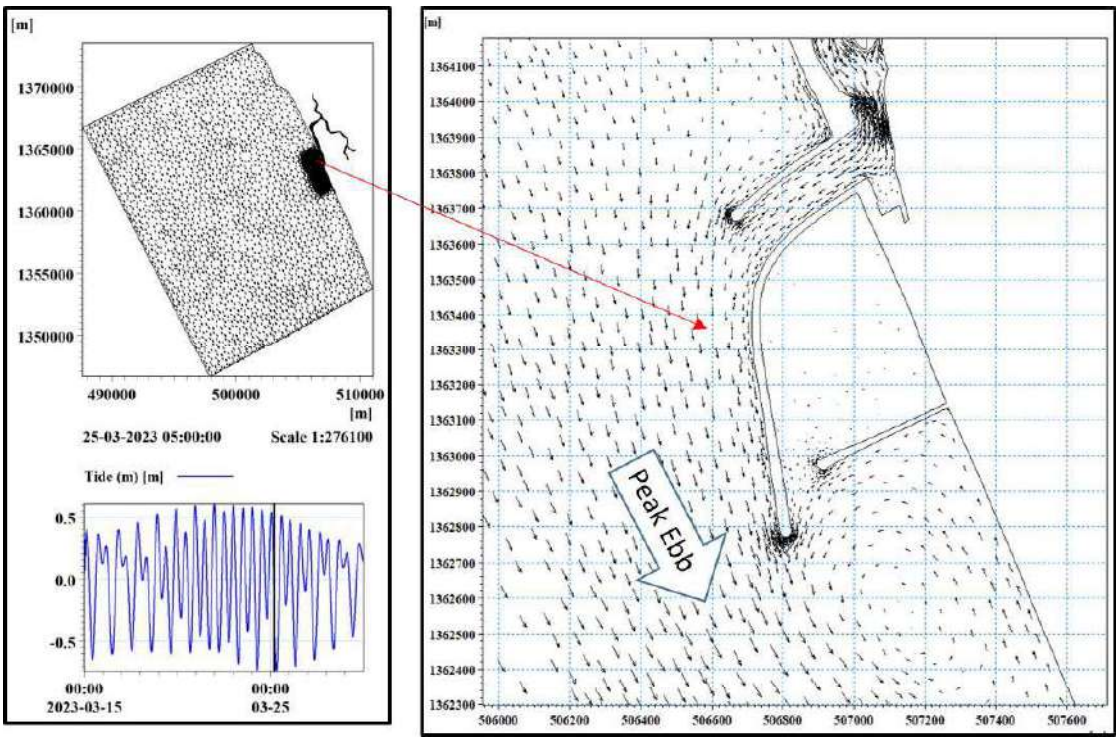


Figure 21: Flow field during peak ebb -Non-monsoon season (Proposed condition)

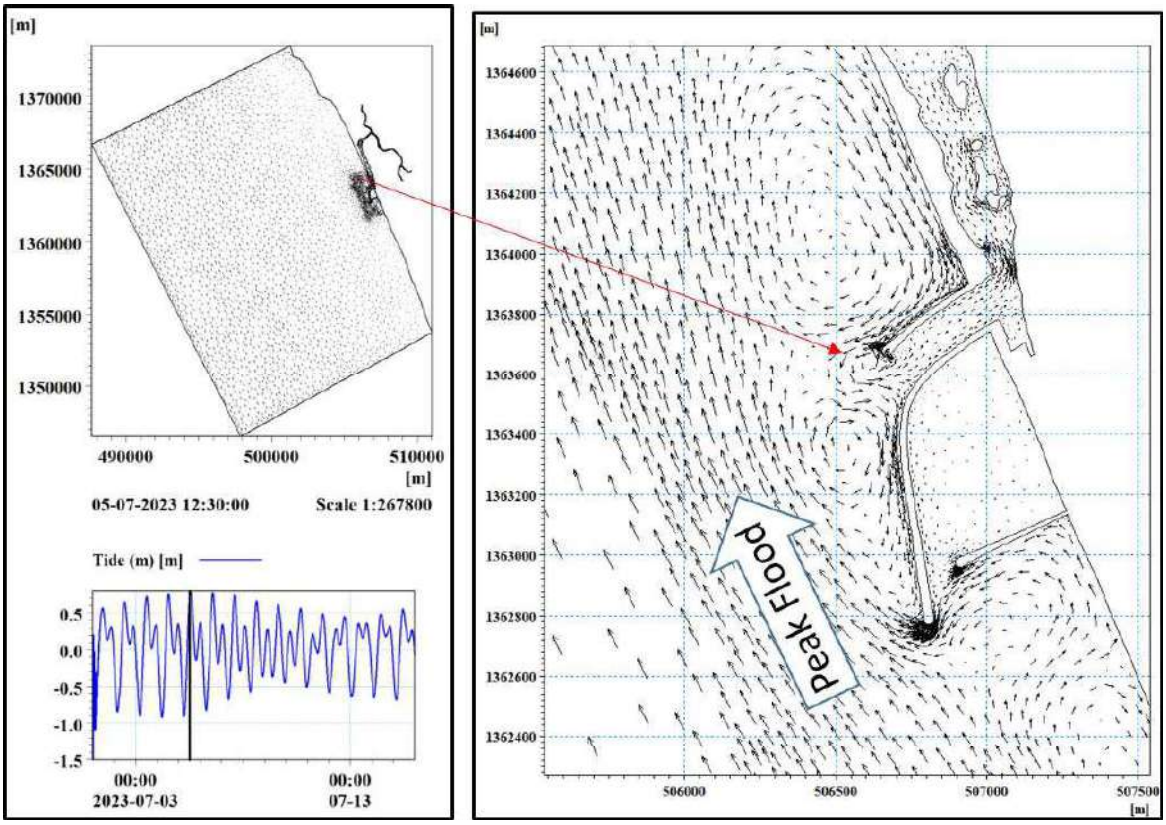


Figure 22: Flow field during peak flood- Monsoon season (Proposed condition)

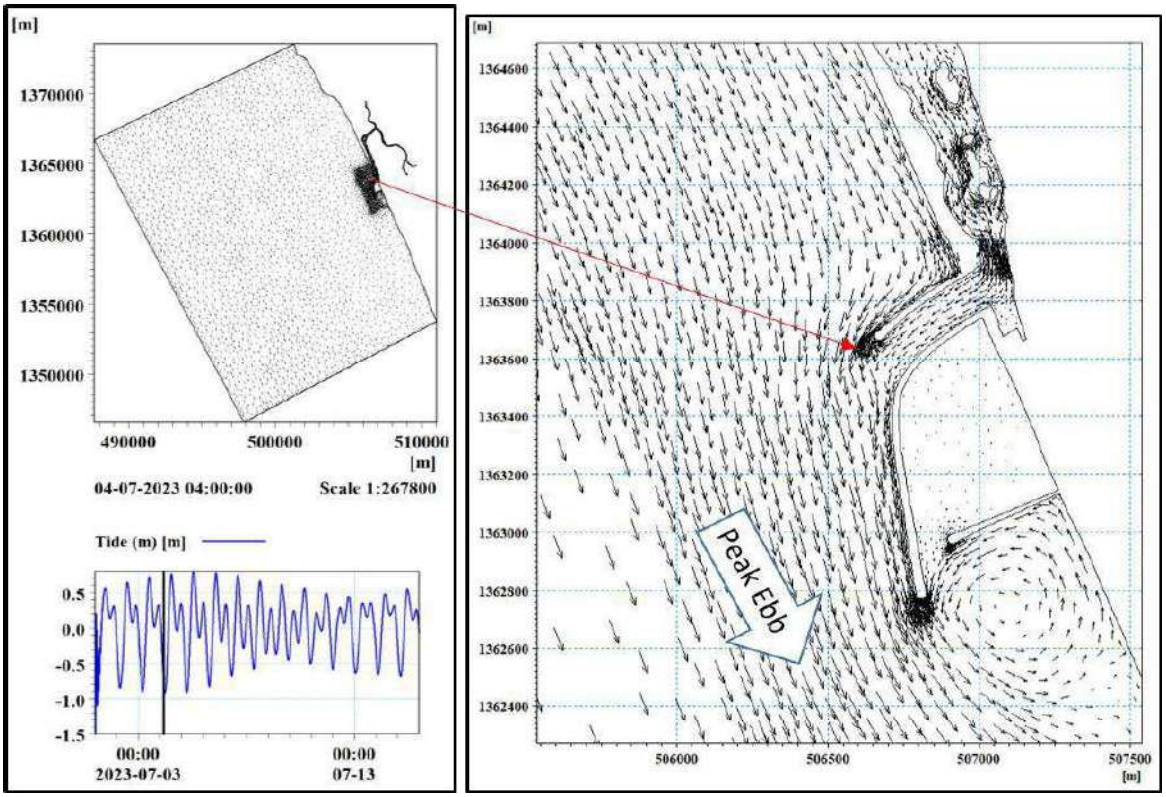


Figure 23: Flow field during peak ebb- Monsoon season (Proposed condition)

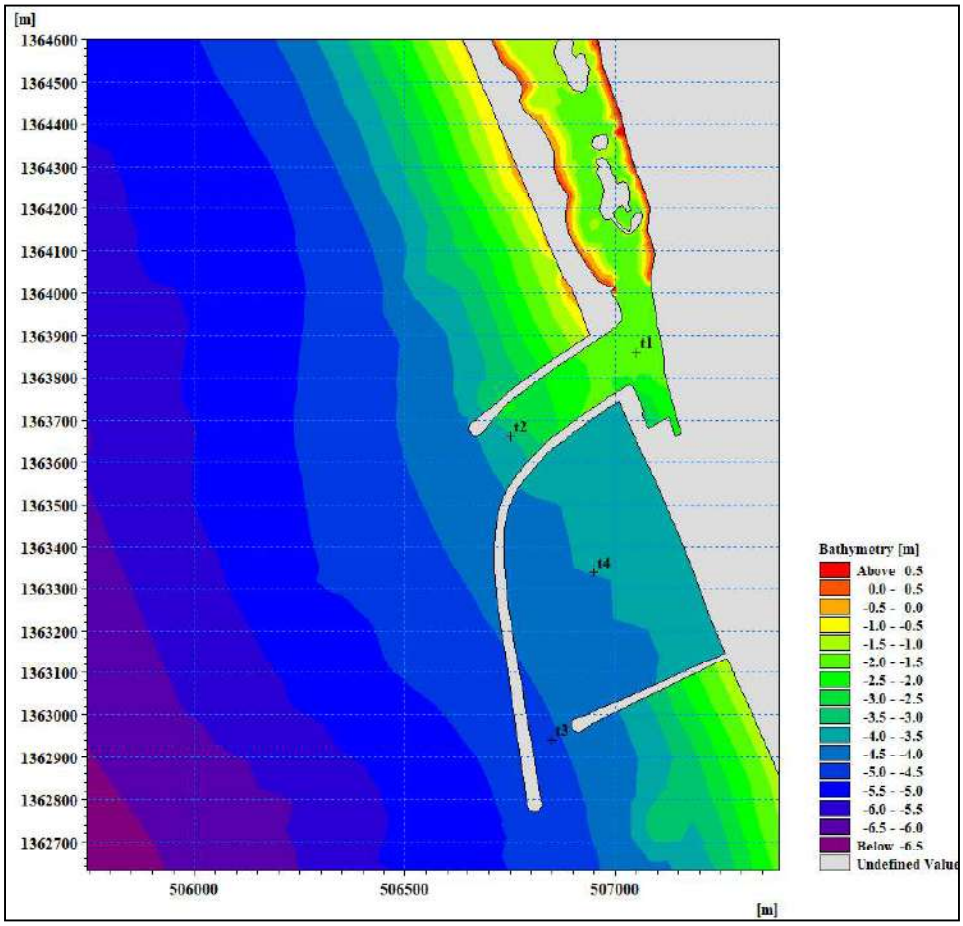


Figure 24: Details of proposed layout with monitoring stations

The computed currents during non-monsoon and monsoon period at all monitoring stations obtained for the proposed layout is compared against the computed currents at corresponding points for the existing condition. The comparison is shown in Fig. 25 and Fig. 26. It is observed from Fig. 25 and Fig. 26 that both during non-monsoon and monsoon season only at the monitoring station t1, there is increase in magnitude (from 0.007 m/s to 0.1m/s during non-monsoon and from 0.015m/s to 0.3m/s during monsoon season) of currents after the proposed construction work. At t2, t3 and t4, the magnitude of currents is significantly reduced after the proposed development. During non-monsoon season, the peak modelled currents at t2, t3 and t4 for existing condition are 0.43m/s, 0.38 m/s and 0.39 m/s respectively. After the proposed development the currents at these three monitoring stations are reduced to 0.11m/s, 0.06m/s and 0.008m/s. However, during monsoon season, at t2, t3 and t4 for existing conditions, the peak modelled currents are 0.55m/s, 0.46m/s and 0.49m/s respectively. The currents at t2, t3 and t4 are reduced to 0.21m/s, 0.11m/s and 0.003m/s after proposed development during monsoon season.

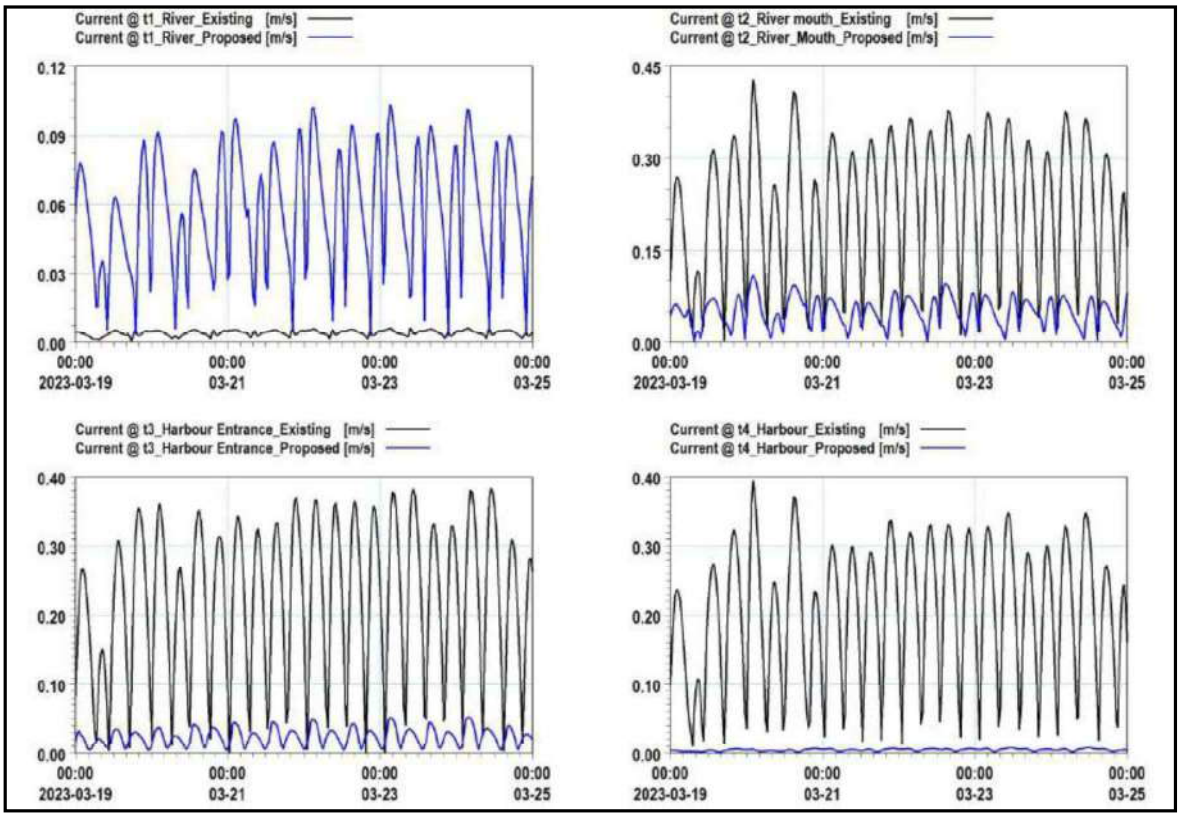


Figure 25: Currents at monitoring stations during Non-monsoon season
(Existing Vs Proposed condition)

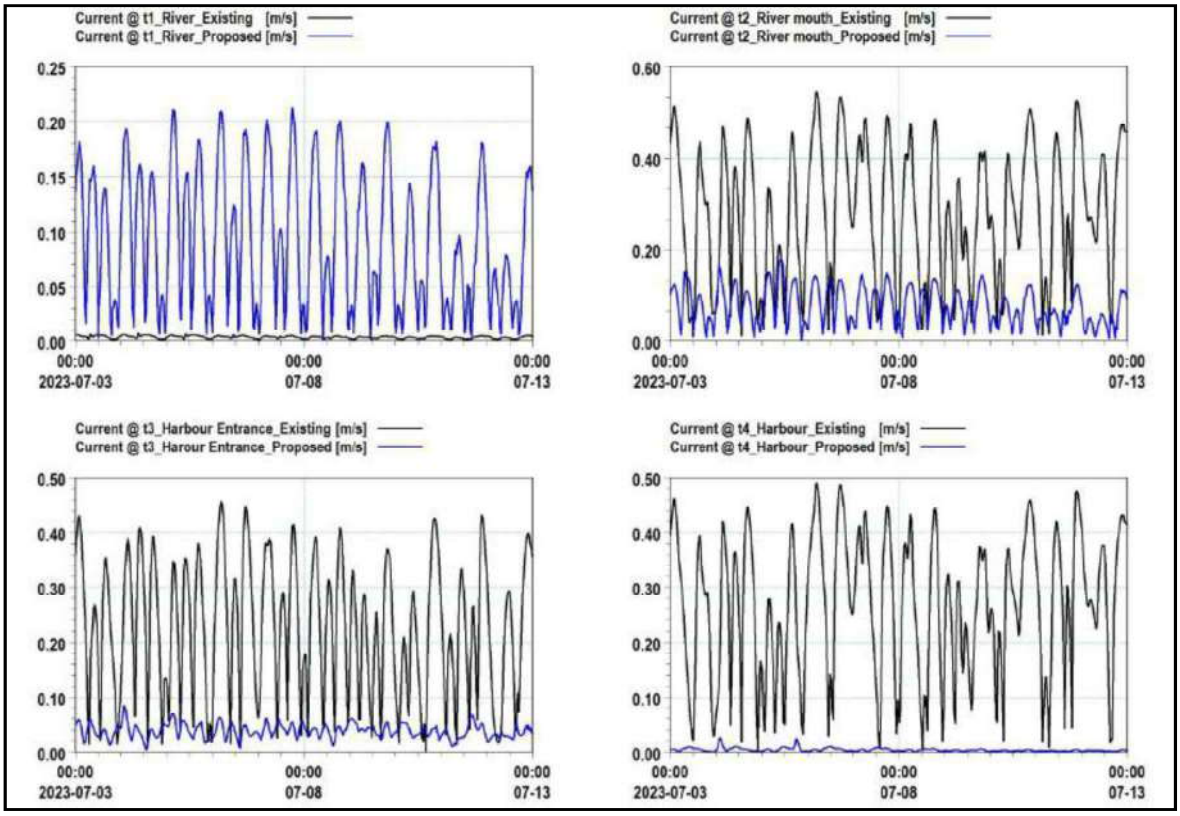


Figure 26: Currents at monitoring stations during Monsoon season
(Existing Vs Proposed condition)

6.6 Sedimentation Studies – Proposed condition- non-monsoon & monsoon seasons

The sedimentation studies were carried out for the proposed conditions for both non-monsoon and monsoon seasons by using MIKE 21 MT module over a period of one month. The sedimentation pattern during non-monsoon and monsoon seasons are shown in Fig. 27 and Fig. 28 respectively. During the monsoon season, there is slight increase in deposition (Fig. 28) at the river mouth and below the southern breakwater as compared to non-monsoon season. The annual sedimentation estimated in the Fishing Harbour is about 0.03m and at the North and South side of the proposed development annual sedimentation is estimated to be about 0.05m. The annual sedimentation estimated at the river mouth is about 0.045m for the proposed condition. The deposition of sediments near the north and south breakwater is majorly due to formation of circulation at these locations.

The sedimentation estimated is slightly higher in the river mouth region for the proposed condition as compared to the existing condition. The minor increase in sedimentation for the river mouth of proposed condition can be attributed to decrease in currents after establishing the proposed layout.

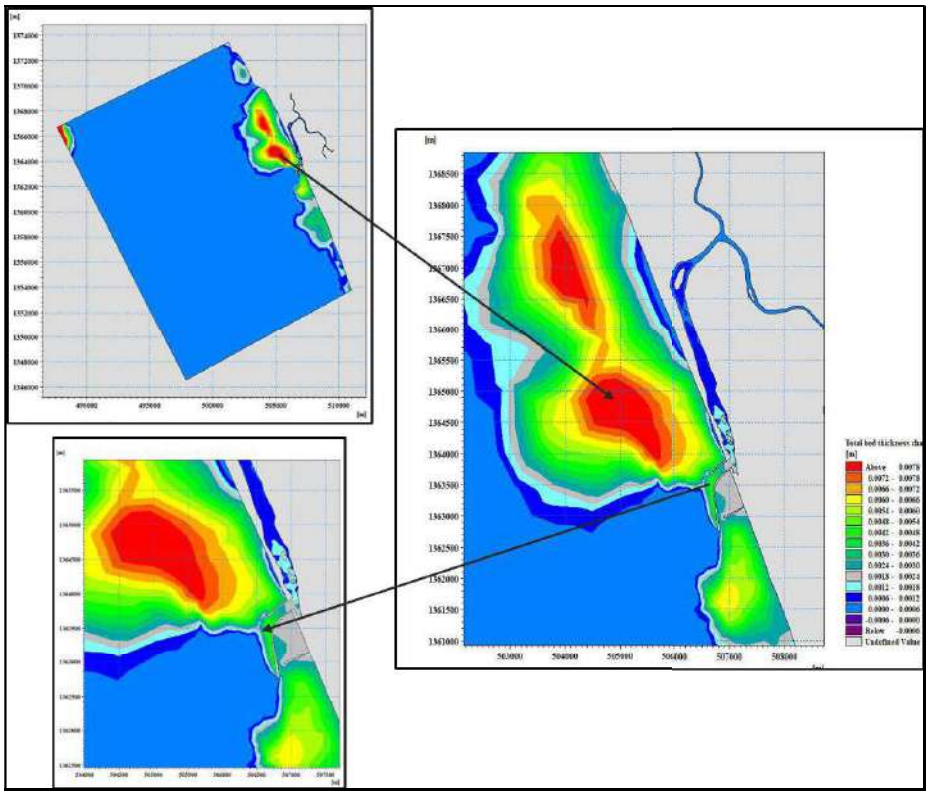


Figure 27: Sedimentation pattern during Non-monsoon season (Proposed)

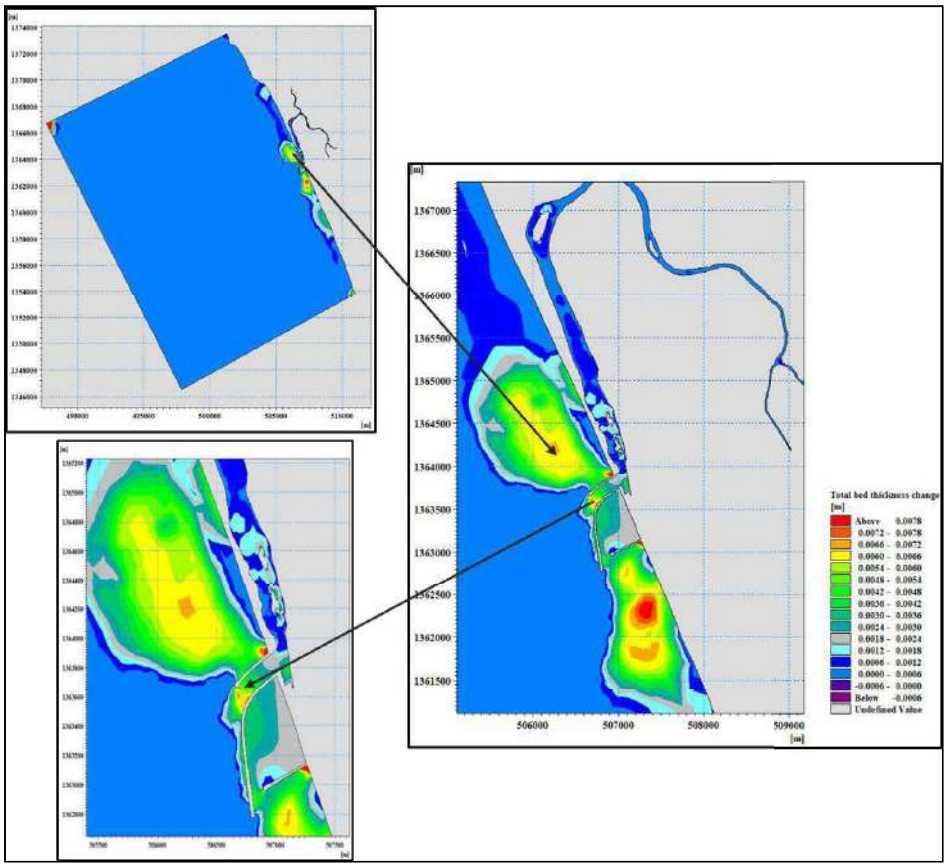


Figure 28: Sedimentation pattern during Monsoon season (Proposed)

6.7 Effect of Littoral Drift

Due to littoral drift, accretion and erosion are taking place on the north and south sides of the proposed development, respectively. The shoreline evolution after 10 years is predicted as accretion on the northern side extending up to 2500m along the shore and about 68m in cross-shore direction, and as erosion on the southern side extending up to 1500m along the shore and about 40m in cross-shore direction. It is observed that the shifting of the river mouth is about 200m towards the north over a year. If the shifting of the river mouth is pronounced after the proposed development of the river training works then a seawall of appropriate length may be provided to arrest the shifting of the river mouth. Similarly, if the erosion on the south side of the proposed fishing harbour is progressive after the development then a suitable shore protection measure in the form of a seawall or series of groynes may be provided.

7.0 CONCLUSIONS

The mathematical modelling studies for the proposed fishing harbour at Ajanur are undertaken. The simulations of hydrodynamics and sedimentation are performed for the existing conditions and for the proposed layout. Both non-monsoon and monsoon seasons are considered. The major conclusions of the study are given below:-

(i) In the existing condition, the hydrodynamic model results during non-monsoon season shows good calibration of the model with the field observed data.

(ii) The sedimentation studies for the existing condition shows some promising results of sedimentation pattern. Under the existing conditions, the estimated annual sedimentation i.e., depth of deposition is about 0.021m at the river mouth.

(iii) For the proposed development, due to dredging in the proposed area, modelling studies shows decrease in the currents in most of the area of study region (monitoring stations t2, t3 and t4) as compared to the existing condition.

(iv) The sedimentation pattern for the proposed condition shows sedimentation of the order of 0.045m per annum near the river mouth. Sedimentation is also noticed near the north and the south breakwaters (0.05 m in a year). In the fishing harbour area sedimentation of about 0.03 m in a year is estimated.

(v) If the erosion on the south side of the proposed fishing harbour is progressive after the development then a suitable shore protection measure in the form of a seawall or series of groynes may be provided.

(vi) If the shifting of the river mouth is pronounced after the proposed development of the river training works then a seawall of appropriate length may be provided to arrest the shifting of the river mouth.

(vii) The capital dredging in the fishing harbour area, in the river mouth and along the river is calculated to be about 1.1Mm^3. During the construction phase there are debris getting deposited in the dredged area. Therefore, this factor should also be considered for effective planning of construction. Also, maintenance dredging should be carried out near the river mouth and at the harbour entrance to maintain the desired depth for smooth movement of marine vessels.

(viii) The study suggest a proposed layout consisting of 1150m long north breakwater, 425m long south breakwater and 435m breakwater as a river training work near the mouth of Chittari river.

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3. MIKE21- Flow Model FM, “User guide for Hydrodynamics module and Mud Transport Module”, Danish Hydraulic Institute (2014).

Annexure-I








Photographs at Ajanur Fishing Harbour

भारत सरकार / GOVERNMENT OF INDIA

जल शक्ति मंत्रालय / MINISTRY OF JAL SHAKTI

जल संसाधन, नदी विकास और गंगा संरक्षण विभाग

DEPARTMENT OF WATER RESOURCES, RIVER DEVELOPMENT AND GANGA REJUVENATION

केंद्रीय जल एवं विद्युत अनुसंधान शाला

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CENTRAL WATER AND POWER RESEARCH STATION

PUNE – 411 024



तटीय जलीय संरचनाएं प्रभाग

COASTAL HYDRAULIC STRUCTURES DIVISION

तकनीकी रिपोर्ट संख्या : 6177

नवम्बर, 2023

TECHNICAL REPORT NO :6177

NOVEMBER, 2023

केरल के कासरगोड़ जिले में स्थित अजानूर में मत्स्य बंदरगाह के लिए तरंगरोधक के डिजाइन के लिए डेस्क और तरंग नलिका अध्ययन

DESK AND WAVE FLUME STUDIES FOR THE DESIGN OF BREAKWATER FOR FISHERY HARBOUR AT AJANUR IN KASARGOD DISTRICT, KERALA

Dr. R.S. Kankara
Director

REPORT DOCUMENTATION SHEET	
Technical Report No. 6177	**Date: NOVEMBER, 2023**
Title: DESK AND WAVE FLUME STUDIES FOR THE DESIGN OF BREAKWATER FOR FISHERY HARBOUR AT AJANUR IN KASARGOD DISTRICT, KERALA	
Officers Responsible for Conducting the Studies: These studies were conducted by Shri B. R. Tayade, Scientist 'D' with the assistance of Dr. Praveen K. M., Scientist 'B', Shri S. P. Jagtap, Assistant Research Officer, Shri G. R. Pardeshi, Shri Deepak Sharma, Research Assistants, Shri Sushant Gupta, UA-II under the supervision of Dr. J. Sinha, Scientist 'E' & Shri A. V. Mahalingaiah, Scientist 'E' and Dr. Prabhat Chandra, Additional Director and overall guidance of Dr. R. S. Kankara, Director, CWPRS, Pune. Shri Prabhakar Chary, Scientist 'C', Mrs. R.S. Erande, Scientist 'B', Mrs. M. C. Pawar, Assistant Engineer, Shri Yognath, J.E. of RSWG group were associated, while conducting the wave flume studies at CWPRS.	
Name and Address of Organization Conducting the Studies **Coastal Hydraulic Structures Division** **Central Water and Power Research Station, Pune, India**	
Name and Address of Authority Sponsoring the Studies: **Chief Engineer,** **Harbour Engineering Department,** **Kamaleswaram, Manacaud,** **Thiruvananthapuram** **Kerala – 695009**	
Synopsis Harbour Engineering Department, Government of Kerala has a proposal to develop a fishing harbour at Ajanur. In view of this, Chief Engineer, Harbour Engineering Department, Govt of Kerala referred hydraulic model studies to CWPRS for the proposed fishing harbour at Ajanur. The studies were undertaken and the Mathematical Model Studies for wave tranquility at the proposed fishing harbour at Ajanur was carried out at CWPRS, Pune. Based on the Mathematical Model Studies, it was suggested to construct 1150 m long north breakwater and 425 m long south breakwater. Accordingly, desk & wave flume studies were conducted to evolve the cross-section of breakwater based on the actual site survey data and other hydraulic parameters. Design of breakwater with tetrapods in the armour was evolved based on the desk and wave flume studies. The design of breakwater at -4.50 m bed level consists of 6.0 t tetrapod in the seaside armour placed on 1:2 slope in double layer from el. +0.0 m to el. +7.0 m. A 7.0 m wide and 0.5 m thick crest slab with 0.5 m thick parapet wall is proposed at el. +6.5 m. The top of crest slab and parapet wall is kept at el. +7.0 m and +8.0 m respectively. A 6.0 m wide toe-berm is provided at el. +0.0 m consists of 2.0 t to 3.0 t stones with a sea side slope of 1:2. The hydraulic stability tests were conducted in the wave flume by reproducing the section to a Geometrically Similar (GS) model scale of 1:29. For the design of breakwater, water level of 2.60 m was considered as the Design Water Level (DWL), 1.40 m above the HWL (Storm Surge + Sea level rise). The significant wave height of 4.0 m was considered for the design of breakwater.	
Keywords Breakwater, Storm Surge, Armour, Tetrapod's, Toe-Berm etc.	

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Photo 12 : Regular wave test with H_s = 4.80 m at MLLW = +0.40 m, t = 10 sec

1.0 INTRODUCTION

Ajanur village (Latitude 12.33^0 N and Longitude 75.18^0 E) in Kasargod District of Kerala is situated on the west coast of India, 15 km south of the district headquarter (Fig. 1). Harbour Engineering Department, Government of Kerala has a proposal to develop a fishing harbour at Ajanur. In view of this, Chief Engineer, Harbour Engineering Department, Govt of Kerala has referred hydraulic model studies to CWPRS for the proposed fishing harbour at Ajanur.

Based on these requirements, Mathematical Model Studies for wave tranquility for the proposed fishing harbour at Ajanur was carried out at CWPRS, Pune (Technical Report No. 5436 of Nov 2016). As per the layout no. 4 suggested in CWPRS Technical Report the harbour basin area comes out to be about 19 ha. Considering the suggestions given by the Technical Sanction committee of PMMSY schemes, Harbour Engineering Department proposed to increase the basin area upto 26 ha. Accordingly, Additional Mathematical Model Studies for wave tranquility (CWPRS Technical Note, July 2022) has been carried out for the proposed increased area. Based on the Mathematical Model Studies, it was suggested to construct 1150 m long north breakwater and 425 m long south breakwater.

Accordingly, desk studies were conducted for evolving the conceptual cross-section of the breakwater using empirical methods and past experience of CWPRS and considering the hydraulic/site conditions such as bathymetry, tides and waves prevailing at site. Thereafter, the wave flume studies were conducted for assessing the hydraulic stability of the proposed breakwater cross-section at Ajanur, Dist. Kasargod, Kerala.

This report describes in detail the desk & the wave flume studies carried out to evolve design of the breakwater for achieving tranquil condition in the proposed fishing harbour at Ajanur, Kerala.

2.0 SCOPE OF STUDIES

For the proposed development of fishery harbour at Ajanur in Kasargod district of Kerala, the following hydraulic model studies entrusted to CWPRS by Chief Engineer, Harbour Engineering Department, Thiruvananthapuram:

1. Additional Mathematical Model Studies for wave tranquility for the revised layout of fishery harbour at Ajanur, Kerala.
2. Desk and wave flume studies for the design of breakwater for fishery harbour at Ajanur in Kasargod district, Kerala.

On the basis of Mathematical Model Studies for wave tranquility for the proposed fishery harbour at Ajanur, 1150 m long north breakwater and 425 m long south breakwater are suggested as shown in Fig. 2.

The scope of the present studies includes evolving the conceptual design for the suggested breakwater based on empirical methods and the conditions prevailing at the site. Further, the conceptual design of the breakwater was assessed for its hydraulic stability by conducting wave flume tests for various design wave conditions.

3.0 SITE CONDITIONS

Ajanur village in Kasargod District is situated about 15km south of district headquarter at Latitude 12.33^{0} N and Longitude 75.18^{0} E in Kerala state. Majority of village population belongs to fishermen community. At present, the fishermen are operating their boats in open sea & they are facing difficulties in navigating the vessels due to shallow depth & direct wave action.

In view of this, Harbour Engineering Department, Govt of Kerala has a proposal to construct a fishery harbour south of the Chittari River mouth at Ajanur in Kasargod district, Kerala.

4.0 DESIGN CONDITIONS

4.1 Tidal Levels

The tides in the region are semidiurnal in nature. The maximum tidal range at Kasargod is about 1.0 m. The tidal currents are generally parallel to the coastline. The following tidal levels at Kasargod have been considered for the wave flume studies (Reference: Admiralty Chart No. 217 of 2019):

Table 1: Normal Tidal Levels at Kasargod, Kerala

Tides	Level w.r.t Chart Datum
Mean Higher High Water (MHHW/HWL)	+1.40 m
Mean Lower High Water (MLHW)	+1.30 m
Mean Sea Level (MSL)	+1.00 m
Mean Higher Low Water (MHLW)	+0.90 m
Mean Lower Low Water (MLLW/LLWL)	+0.40 m

A Design Water Level (DWL) of 2.60 m was considered including MHHW and 1.20 m above the MHHW i.e Storm Surge (0.80 m) + Sea level rise (0.40 m). These water levels are with respect to Chart Datum (CD). The design of breakwater cross-sections was also tested at HWL, MSL and LLWL water levels.

4.2 Design Wave Conditions

The predominant wave direction at proposed site in Kasargod district is SSW. Following design conditions were considered for the stability of the breakwater against wave attack and to provide tranquil condition in the harbour area:

1. Zero-order (0 to 1 %) damage for the significant wave height of 4.0 m at +2.60 m (DWL) and +1.40 m (HWL).
2. Overtopping is not permitted.
3. The wave periods considered for the tests are 8, 10 and 12 seconds.
4. The stability of the section is also to be assessed at an intermediate water level and low water level.

5.0 DESIGN OF BREAKWATER

The desk and wave flume studies have been conducted for evolving cross-section of the breakwater with tetrapods in the armour layer based on empirical formulae, existing conditions at the site and previous in-house extensive wave flume studies conducted at CWPRS for hydraulic stability of breakwater. The weight of armour units are basically evaluated based on Hudson's formula (as given below):

$$W = \frac{w_r H_b^3}{K_D \times (Sr-1)^3 . \cot\theta}$$

Where,

H_b = Breaking wave height (m)
W = Weight of Armour (t)
w_r = Unit Weight of Armour (t/m^3)
K_D = Stability Coefficient for Breaking Wave Height
S_r = Specific Gravity of Armour relative to Water at the structure (w_r / W_w)
W_w = Unit wt. of sea water (t/m^3)
Cot θ = Slope of armour

The conceptual design cross-section of the breakwater with tetrapods in the armour were evolved based on the desk studies as shown in Fig. 4. The design of breakwater at -4.50 m bed level consists of 6.0 t tetrapod in the seaside armour placed on 1:2 slope in double layer from el. +0.0 m to el. +7.0 m. A 7.0 m wide crest slab with 0.5 m thick parapet wall is proposed with top el. +7.0 m. The top of parapet wall is kept at el. +8.0 m. A 6.0 m wide toe-berm is provided at el. +0.0 m consists of 2.0 t to 3.0 t stones with a sea side slope of 1:2. Secondary layer consists of 0.5 – 1.0 t stones below the armour layer and 200 – 300 kg stones below the toe-berm armour. A 0.30 m thick bedding layer consisting of stones up to 20 kg is provided at -4.50 m bed level.

6.0 HYDRAULIC MODEL STUDIES

6.1 Random Sea Wave Flume

The random sea wave flume having dimensions 90 m (length) x 2 m (width) x 1.50 m (height) was utilised for the wave flume tests as shown in Annexure-I / Photo 1. The system is capable of generating maximum wave height

of 0.4 m at a water depth of 0.6 m for wave periods ranging between 0.3 and 3 sec. The flume facility is equipped with a fully automated computerised random wave generating system comprising of computer, hydro-servo system and wave board assembly. The command signals are sent by computer to the servo-valve through which pressurised oil supplied by hydraulic power pack flows into the actuator. A *To* and *Fro* motion of the piston drives the wave board, which in turn generates waves in the flume.

6.2 Wave Measurement and Calibration

The wave heights were measured by capacitance type wave probes. A gauge was fixed in front of the model and was analysed by computer. The desired wave conditions in front of the model were obtained by matching of desired spectrum and achieved spectrum by iterative procedure.

6.3 Wave Flume Test Procedure

The cross-section of the breakwater was tested under a normal attack of waves in a 2-D wave flume for its hydraulic stability (Photo 1). The model of breakwater cross-section was constructed to a Geometrically Similar (GS) scale in the wave flume. The dimensions of the random wave flume are 90 m length, 2 m width and 1.5 m depth wherein both regular as well as random waves of desired wave height/wave period and desired standard wave spectrum respectively can be generated. Before starting the test, the number of tetrapods provided in the armour and stones in the toe-berm were counted. After conducting the tests for one-hour duration, the number of tetrapods/stones, if any, displaced from its original position were recorded and percentage of damage to the armour/toe-berm of breakwater was determined. During the test, the extent of splashing/overtopping over the crest was also recorded. The damage is expressed as percentage of number of tetrapods/stones displaced from their position. The percentage of damage is equal to "Number of units displaced/total no. of units used in the respective layer".

6.4 Model Scale

The model tests for design of cross-section of the breakwater were conducted in 2-D wave flume by reproducing the section to a Geometrically Similar scale of 1:29. The model was based on Froude's criterion of similitude. Various scales obtained are as follows:

Table 2: Scale Ratio for Model Studies of the Breakwater

Model scale 1:29		
Length	λ	= 1:29
Area	λ^2	= 1:841
Volume	λ^3	= 1:24389
Time	$\lambda^{1/2}$	= 1:5.385
Velocity	$\lambda^{1/2}$	= 1:5.385

6.5 Gradation of Stones

Details of various gradations of stones in prototype of the trunk of the breakwater and those used in the model having scale 1:29 are given table 3:

Table 3: Gradation of Stones for Trunk of Breakwater

Prototype		Model (Scale 1:29)	
Average	Gradation	Average	Gradation
2.5 t	2 – 3 t	100 gm	80 to 120 gm
1.5 t	1 – 2 t	60 gm	40 to 80 gm
0.75 t	0.5 – 1 t	30 gm	20 to 40 gm
250 kg	200 – 300 kg	10 gm	8 to 12 gm

6.6 2-D Wave Flume Tests

The cross section of the breakwater, as shown in Fig. 4, was constructed with a Geometrically Similar model scale of 1:29 in the wave flume. Tests were conducted considering both random and regular wave conditions to assess the stability of the breakwater. For random waves, 4.0 m significant wave height (H_s) was considered. To achieve this H_s, Pierson-Moskowitz (PM) spectrum was used for acquiring desired wave height in the 90 m wave flume. For acquiring desired

regular wave height i.e. non breaking wave height in front of the breakwater, series of wave height analysis was carried out with the help of in-house computer program.

The tests were carried out at DWL, MHHW, MSL & MLWL with various wave conditions. The tests were conducted for one-hour duration each in the model corresponding to about 5.39 hours (approx.) in the prototype. The objectives of the tests were to check hydraulic stability of the breakwater against various wave conditions likely to occur in the vicinity of proposed fishery harbour area at Ajanur, Kasargod district.

The details of the wave flume tests were conducted for breakwater cross-section at -4.50 m bed level with random waves are described as follows:

1) Initially, a test was conducted with random waves at a significant wave height (H_s) of 4.05 m at Design Water Level (+2.60 m) for one hour duration (corresponding to 5.39 hours in prototype) using PM (Pierson-Moskowitz) spectrum. There was no overtopping and moderate splashing observed during the test. The test showed that there was no damage occurred to both armour layer and toe-berm (Photograph No. 2).

2) An endurance test was conducted at Design Water Level (+2.60 m) with random waves using PM (Pierson-Moskowitz) spectrum for the significant wave height of 4.85 m (120% of H_s i.e. 4.80 m) for one hour duration. During the test, it was observed that there was moderate splashing but no overtopping. After conducting the test for one hour duration, no damage was observed in the armour and the toe-berm (Photograph No. 3).

3) Further, a test was conducted with random waves at a significant wave height (H_s) of 4.0 m at the Mean Higher High Water (MHHW) (+1.40 m) for one hour duration using PM (Pierson-Moskowitz) spectrum. There was no splashing and no overtopping observed during the test. After the test, it was observed that there was no damage occurred in the armour as well as in the toe-berm (Photograph No. 4).

4) Another test was conducted with random waves at a significant wave height (H_s) of 3.97 m at Mean Sea Level (+1.00 m) for one hour duration (corresponding to 5.39 hours in prototype) using PM (Pierson-Moskowitz) spectrum. During the test, no splashing and no overtopping was observed. There was no damage to the toe-berm as well as to the armour observed after the test (Photograph No. 5).

5) A test was conducted with random waves at a significant wave height (Hs) of 3.76 m at Mean Lower Low Water Level (+0.40 m) for one hour duration (corresponding to 5.39 hours in prototype) using PM (Pierson-Moskowitz) spectrum. No splashing and no overtopping were observed during the test. After the test, it was observed that there was no damage to the toe- berm as well as to the armour (Photograph No. 6).

From the past experiences during the model testing, it has been revealed that many-times the structures were also susceptible to undergone damages during the regular wave conditions, therefore the cross-section of breakwater was also tested in the regular wave conditions.

The details of **regular wave testing** on the breakwater cross-section are as follows:

6) A test was conducted, at the Design Water Level of +2.60 m under the attack of regular waves of 10 sec period with wave height (H_{10}) of 5.0 m. There was minor overtopping and moderate splashing of waves observed during the test. The maximum wave run-up was upto +5.85 m and run-down was up to +0.72 m were observed. After conducting the test under the condition for one hour in the wave flume, no damage was observed in the armour layer and in the toe-berm (Photograph No. 7).

7) A test was also carried out under the attack of regular (monochromatic) waves at Mean Higher High Water (+1.40 m). The duration of test was one hour in the model corresponding to about 5.39 hours in the prototype. The test was conducted for wave height of (H_{10}) of 5.12 m with 12 second period. During the test, it was noticed that the maximum wave run-up was upto +5.0 m and run-down was up to +0.15 m. There

was no damage observed to the toe-berm stones and to the armour layer after the test. There was no splashing and no overtopping of waves observed (Photograph No. 8).

8) Further, a test was conducted for one hour duration at Mean Higher High Water (MHHW) of +1.40 m under the attack of regular waves of 10 sec period with wave height (H_{10}) of 5.0 m. During the test, no overtopping and no splashing was observed. The maximum wave run-up was upto +5.10 m and run-down was up to (-) 0.20 m. No damage was observed in the armour layer and in the toe-berm (Photograph No. 9).

9) Another test was conducted for one hour duration at Mean Higher High Water (MHHW) of +1.40 m under the attack of regular waves of 8 sec period with wave height (H_{10}) of 5.0 m. During the test, no splashing and no overtopping was observed. The max wave run-up was up to +4.25 m and run-down up to +0.00 m were observed. After conducting the test, there was no damage observed in the armour layer and toe-berm (Photograph No. 10).

10) A test was also carried out under the attack of regular (monochromatic) waves at Mean Sea Level (+1.00 m). The duration of test was one hour in the model corresponding to about 5.39 hours in the prototype. The test was conducted for wave height of 5.07 m (H_{10}) with 10 second period. During the test, it was observed that the maximum wave run-up and run-down was up to +3.50 m and up to (-) 0.50 m respectively. There was no damage observed in the toe-berm as well in the armour. No splashing and no overtopping of waves were observed (Photograph No. 11).

11) Another test was conducted for one hour duration at Mean Lower Low Water Level (MLLW) of +0.40 m under the attack of regular waves of 10 sec period with wave height (H_{10}) of 4.60 m. During the test, no splashing and no overtopping was observed. The max wave run-up was up to +3.50 m and run-down up to (-) 1.10 m were observed. After conducting

the test, there was no damage observed in the armour layer and toe-berm (Photograph No. 12).

All results of tests conducted for the cross-section of the breakwater (trunk portion) are summarized in the Table 4, and photographs of all the tests are enclosed as Annexure-V.

Overall, the cross-section of the breakwater was found stable against the higher wave action at high water level. No damage to the toe-berm and to the armour layer of breakwater were observed during the tests. Therefore, the section was found to be hydraulically stable against the design wave conditions adopted for the design of the proposed breakwater for fishery harbour at Ajanur, Dist Kasargod, Kerala.

Table 4: Summary of the Wave Flume Test conducted at RSWG

Name of the Project – Breakwater for fishery harbour at Ajanur in Kasargod district, Kerala
Model Scale = 1:29, Armour Unit = 6 t Tetrapod, Toe-Berm = Stone (2 – 3 t)
DWL = +2.60 m, MHHW = +1.40 m, MSL = +1.00 m, MLLW = +0.40 m
Test Duration = 1 hour (5.39 Hrs Proto), Bed Level = -4.50 m
Spectrum - Pierson-Moskowitz Spectrum

Sr. No	Water Level	Wave Height	Splashing	Over-topping	Run-up	Run-down	Damage		Remark	Photograph No.
							Toe-berm	Armour		
Random Wave Tests										
1	DWL	H_s = 4.05 m	Moderate	Nil	N.A.	N.A.	Nil	Nil		2
2	DWL	H_s = 4.85 m	Moderate	Nil	N.A.	N.A.	Nil	Nil	Endurance Test	3
3	MHHW	H_s = 4.0 m	Nil	Nil	N.A.	N.A.	Nil	Nil		4
4	MSL	H_s = 3.97 m	Nil	Nil	N.A.	N.A.	Nil	Nil		5
5	MLLW	H_s = 3.76 m	Nil	Nil	N.A.	N.A.	Nil	Nil		6
Regular Wave Tests										
6	DWL	H_{50} = 5.0 m	Moderate	Minor	Upto +5.85 m	Upto +0.72 m	Nil	Nil	T = 10 sec	7
7	MHHW	H_{50} = 5.12 m	Minor	Nil	Upto +5.0 m	Upto +0.15 m	Nil	Nil	T = 12 sec	8
8	MHHW	H_{50} = 5.0 m	Nil	Nil	Upto +5.10 m	Upto (-)0.20 m	Nil	Nil	T = 10 sec	9
9	MHHW	H_{50} = 5.0 m	Nil	Nil	Upto +4.25 m	Upto +0.0 m	Nil	Nil	T = 8 sec	10
10	MSL	H_{50} = 5.07 m	Nil	Nil	Upto +3.50 m	Upto (-)0.50 m	Nil	Nil	T = 10 sec	11
11	MLLW	H_{50} = 4.80 m	Nil	Nil	Upto +3.90 m	Upto (-)1.10 m	Nil	Nil	T = 10 sec	12

7.0 RECOMMENDED CROSS-SECTIONS OF THE BREAKWATER

After conducting several tests, the cross-section of the breakwater at -4.50 m bed level was found stable against various wave conditions. The details of the cross-section of the breakwater at various bed levels are as follows:

1) Trunk Portion at -2.0 m Bed Level (to be adopted from -2.0 m to +0.0 m Bed level)

The cross-section is designed for the -2.0 m bed level as shown in Fig. 3. This cross-section may be adopted from -2.0 m to +0.0 m bed level range. The cross-section of the breakwater consists of 2 t tetrapods provided in the armour layer with 1:2 slope on the sea-side from el. +2.20 m to +7.0 m and 0.5 to 1.0 t stones provided in the armour with 1:2 slope on the leeside. A 4.0 m wide toe-berm on the seaside consists of 0.5 to 1 t stones is kept at el. +2.20 m. Secondary layer consists of 200 to 300 kg stones provided below the armour layer and 50 to 100 kg stones provided below the toe-berm and leeside armour. Core consists of 20 to 50 kg stones and 0.30 m thick bedding layer consists of stones up to 20 kg. A PCC crest of 0.5 m thick is provided at el. +6.50 m soffit level with sea-side parapet top at el. +8.0 m. A clear carriageway width of 7 m is provided on the crest slab for the movement of vehicles / machineries in future during the inspection / supervision or maintenance purpose.

2) Trunk Portion at -4.50 m Bed Level (to be adopted from -2.0 m to -4.50 m Bed level)

The cross-section of breakwater at -4.50 m bed level is shown in Fig. 4. The cross-section of the breakwater consists of 6 t tetrapods provided in the armour layer with 1:2 slope on the sea-side from el. +0.0 m to +7.0 m and 1 to 2 t stones provided in the armour with 1:2 slope on the leeside. A 6.0 m wide toe-berm on seaside is kept at el. +0.0 m consists of 2 to 3 t stones. The secondary layer consists of 0.5 to 1.0 t stones provided below the armour layer and 200 to 300 kg stones provided below the toe-berm and 100 to 200 kg stones provided below the leeside armour. Core consists of 20 to 100 kg stones and 0.30 m thick bedding layer consists of stones up to 20 kg is provided at

-4.50 m bed level. A 7.0 m wide PCC crest slab of 0.5 m thick is provided at el. +6.50 m soffit level with sea-side parapet top at el. +8.0 m.

3) Roundhead at -4.50 m Bed Level

The cross-section and plan of roundhead portion of breakwater at -4.50 m bed level are shown in Figs. 5 & 6 respectively. The section consists of 8 t tetrapods placed in the armour (double layer) on 1:2 slope and are supported with the 6.0 m wide toe-berm consisting of 3 to 4 t stones at el. +0.0 m. A 8.0 m wide PCC crest slab is provided with top at. +8.0 m. A clear carriageway width of 8 m is provided on the crest slab for the movement of vehicles / machineries in future during the inspection / supervision or maintenance purpose. Secondary layer consists of 0.5 to 1.0 t stones provided below the armour layer and below the toe-berm. Core consists of 20-100 kg stones. A 0.3 m thick bedding layer is provided with stones upto 20 kg.

8.0 CONCLUDING REMARKS AND RECOMMENDATIONS

Based on the desk and the wave flume studies carried out for design of the breakwater for fishery harbour at Ajanur in Kasargod District, Kerala, the following concluding remarks are drawn:

1. The recommended cross-section of the breakwater with tetrapods in the armour layer is shown in Fig. 3 to Fig. 6. The cross section is hydraulically stable under the design wave conditions & therefore, recommended to implement at the proposed site.
2. The end of the breakwater should be protected by providing proper roundhead as shown in Figs. 5 & 6. The construction phasing may be adhered, in order to have a safety and economy of the project. If, the construction of the breakwater may not be possible during one season, as such, a temporary roundhead at the end portion may be provided wherever the work is curtailed.
3. The density of concrete and stones to be used for construction of the breakwater should be about 2.4 t / m^3 and 2.6 t / m^3, respectively.

4. There should not be any deviation from the design during the construction of the breakwater in respect of levels, slopes and weights of the stones.

5. The crest slab and the parapet wall provided at the crest of the breakwater may be constructed monolithically.

6. The packing density of the 2 t Tetrapods, 6 t Tetrapods and 8 t Tetrapods (double layer) in the armour layer of breakwater is 117 Nos., 56 Nos. and 47 Nos. per 100 sq. m. of area. The specification of 2 t Tetrapods, 6 t Tetrapods and 8 t Tetrapods are enclosed as Annexure-II, III and IV respectively.

7. All levels of the proposed breakwater should be correlated with Chart Datum before construction at the site.

8. The grading of the stones to be used in the construction for the breakwater should be as follows :

2 – 3 t stones	- 50% stones should be higher than 2.50 t
1 – 2 t stones	- 50% stones should be higher than 1.50 t
0.5 – 1 t stones	- 50% stones should be higher than 0.75 t
200 – 300 kg stones	- 50% stones should be higher than 250 kg
100 – 200 kg stones	- 50% stones should be higher than 150 kg
20 – 100 kg stones	- 75% stones should be higher than 60 kg

9. The rubble mound structures are flexible structures and it is essential to monitor and maintain them regularly. Therefore, periodic survey of the breakwater and maintenance of the breakwater, as and when any damage occurs may be undertaken.

10. It is suggested to carry out geotechnical investigations to check the probable sinkage at the site before the construction of the breakwater.

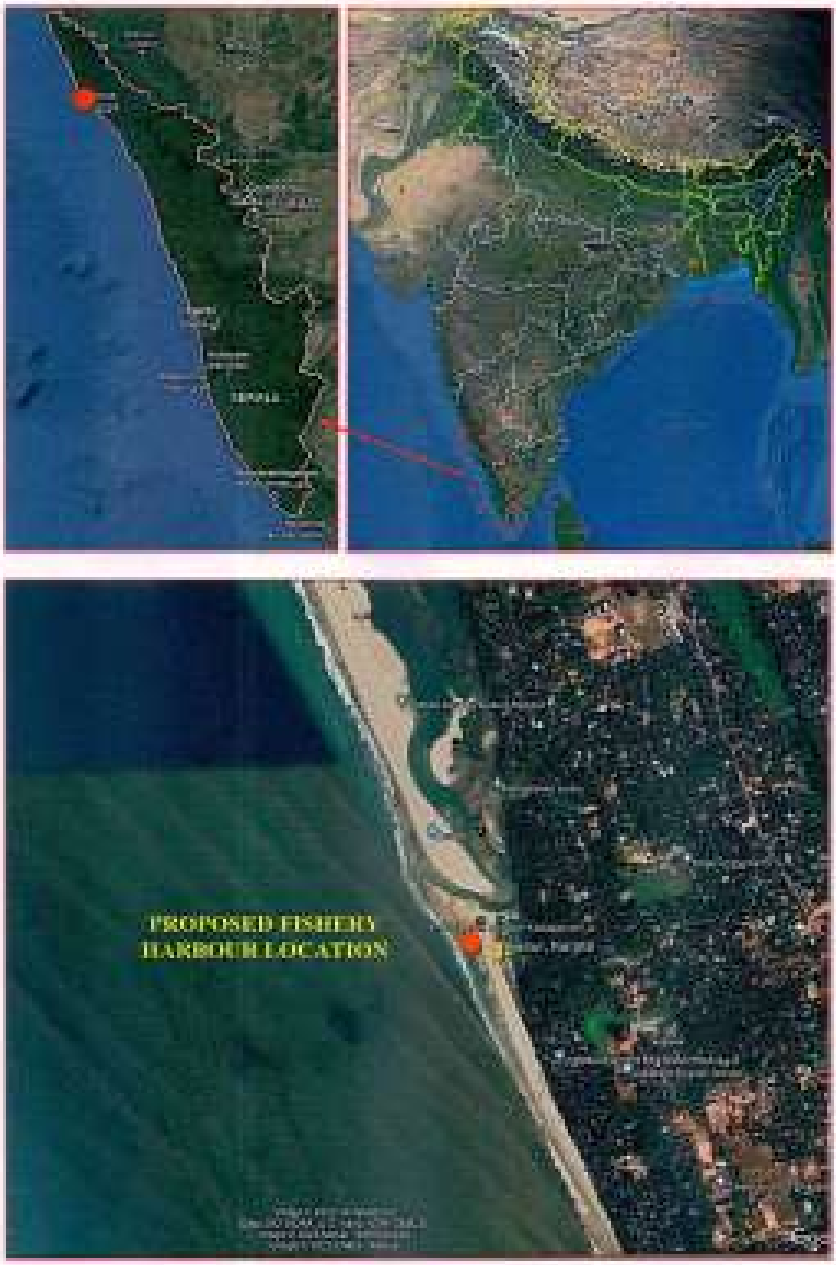


Fig. 1: Index and Location Map of Ajanur, Kasargod District, Kerala.

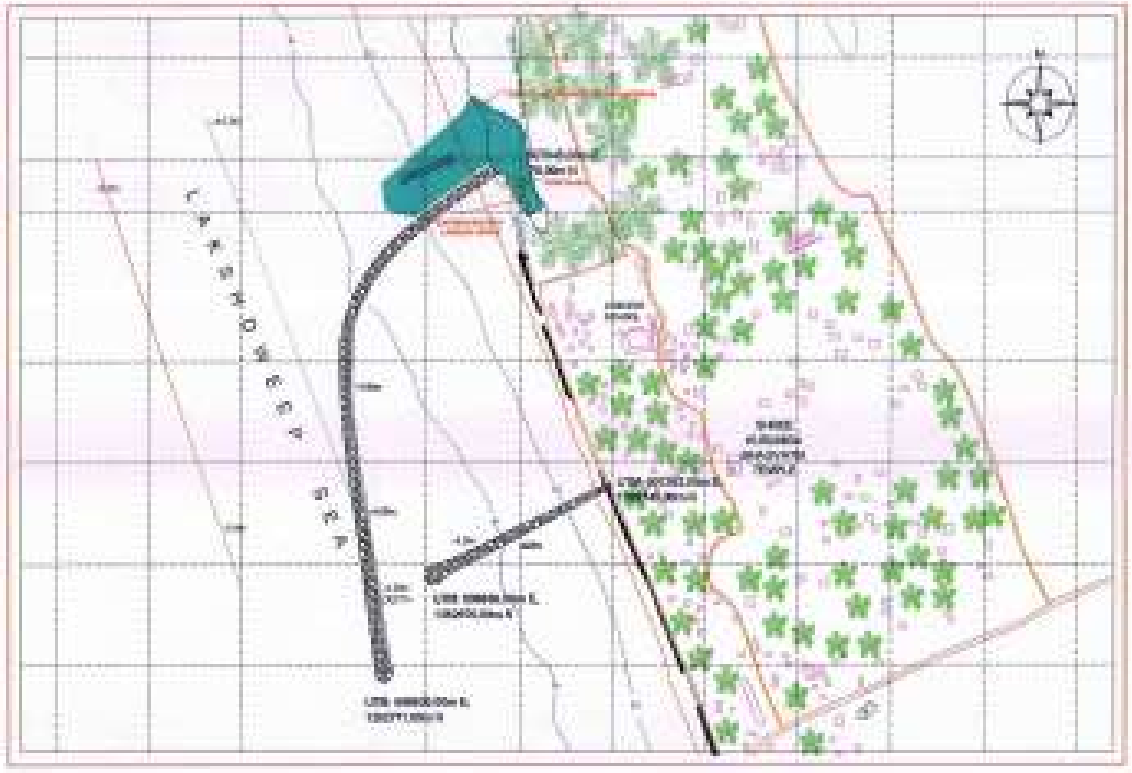


Fig. 2: Layout Plan for Proposed Fishing Harbour at Ajanur, Kasargod District, Kerala

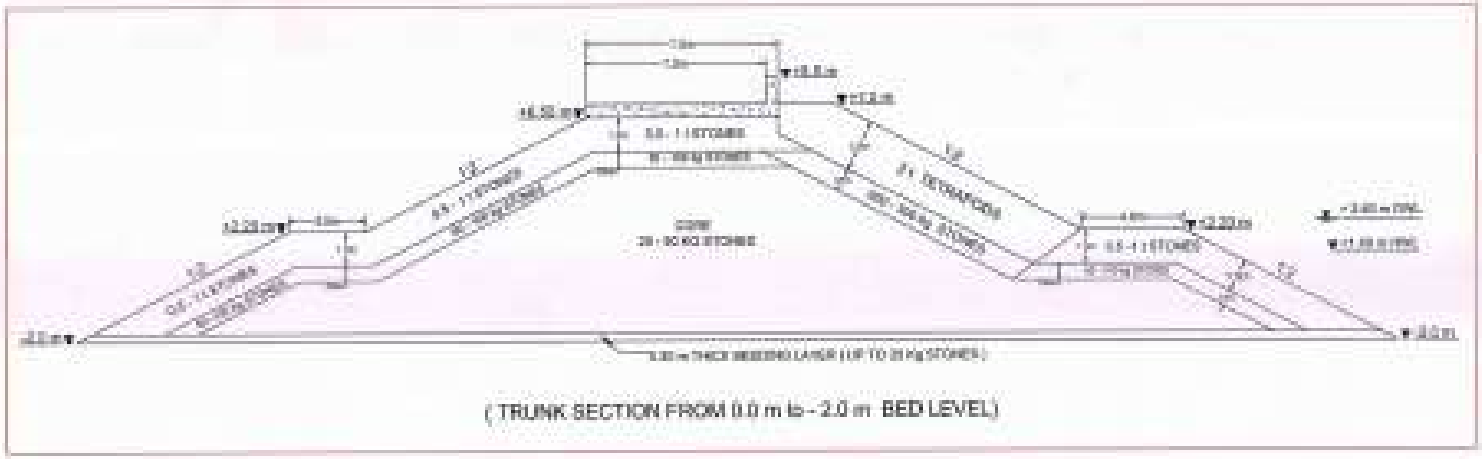


Fig. 3: Design Cross-Section of Breakwater at -2.0 m Bed Level at Ajanur, Kasargod District, Kerala

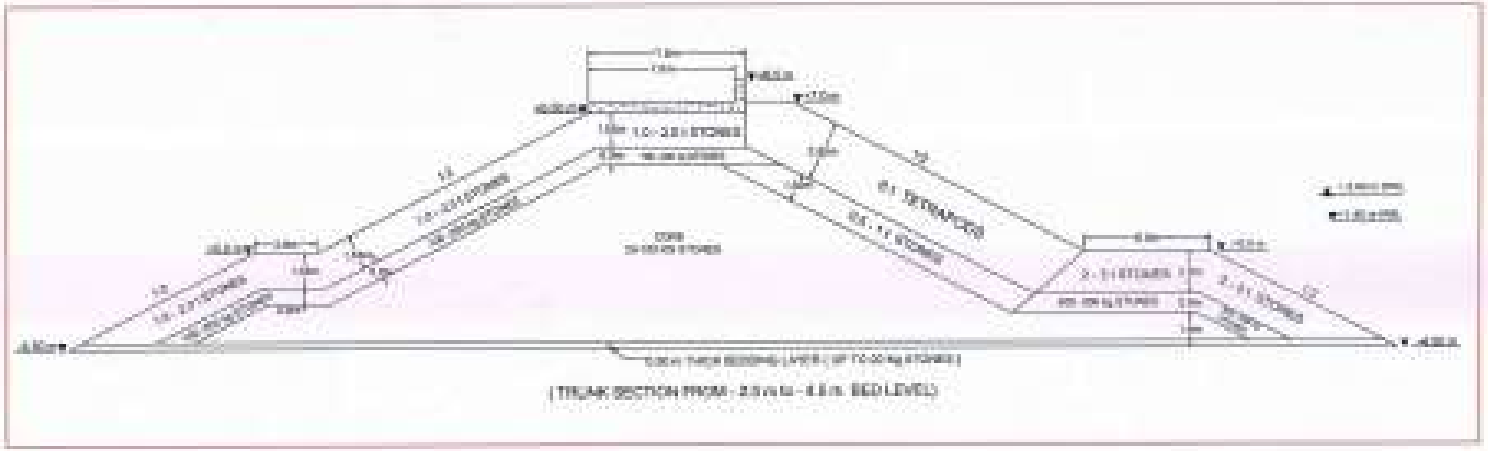


Fig. 4: Design Cross-Section of Breakwater at -4.50 m Bed Level at Ajanur, Kasargod District, Kerala

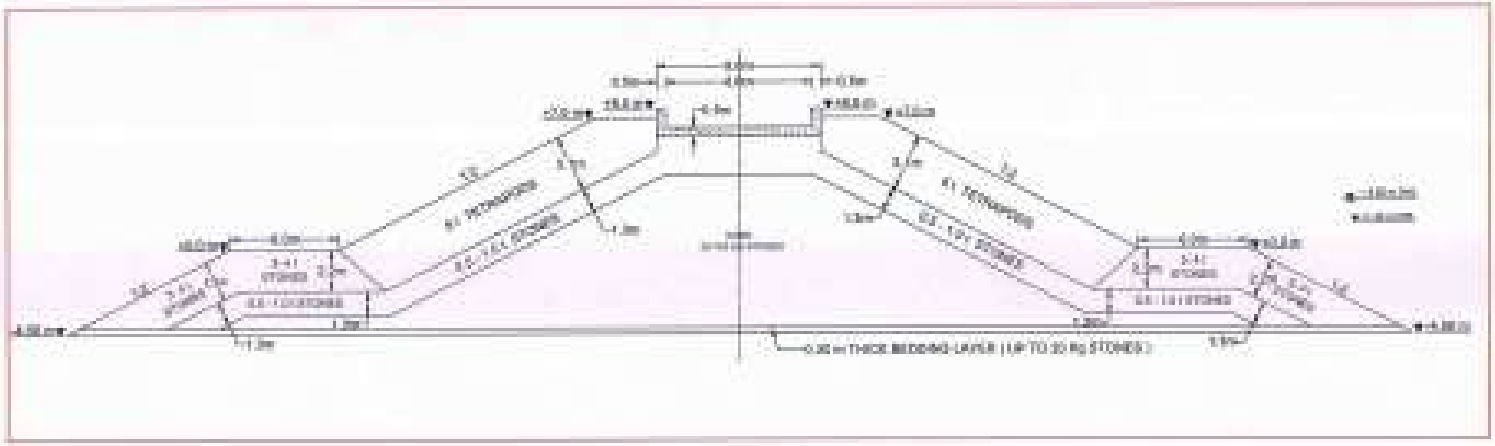


Fig. 5: Roundhead Section of Breakwater at -4.50 m Bed Level at Ajanur, Kasargod District, Kerala

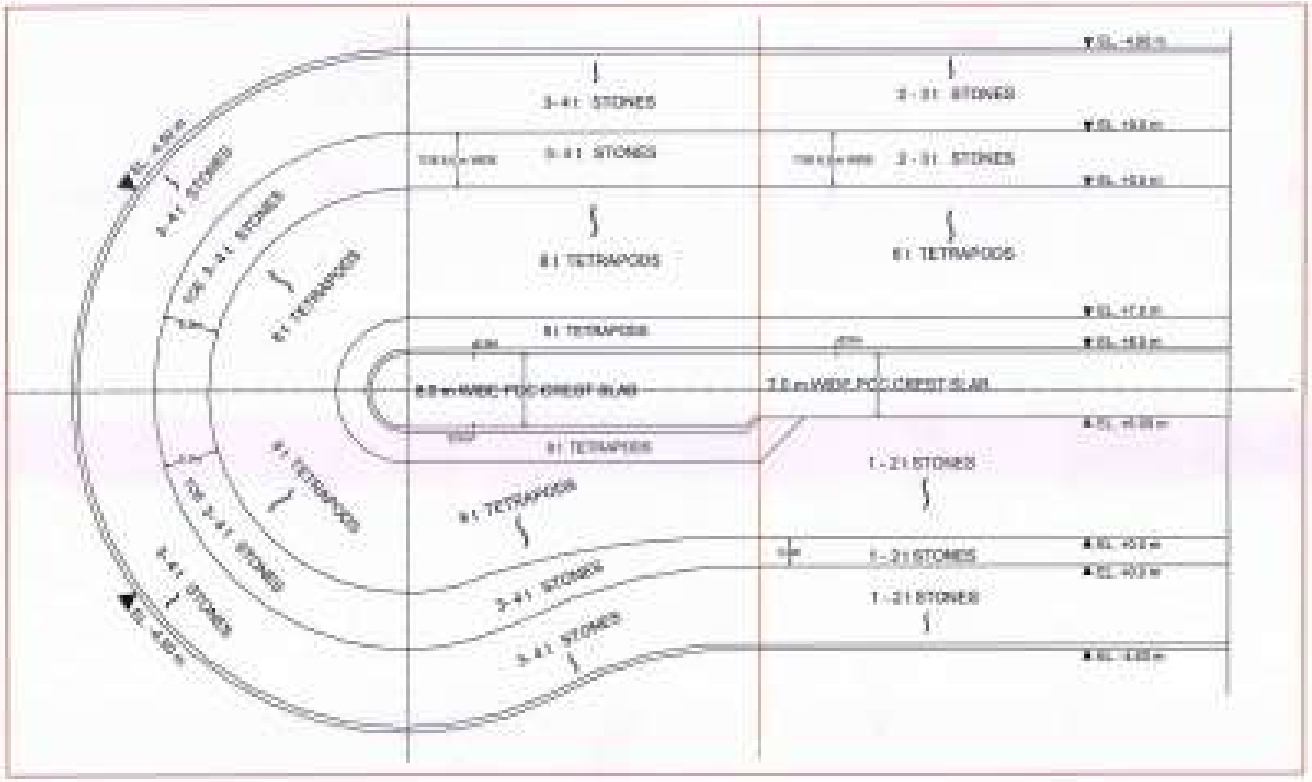
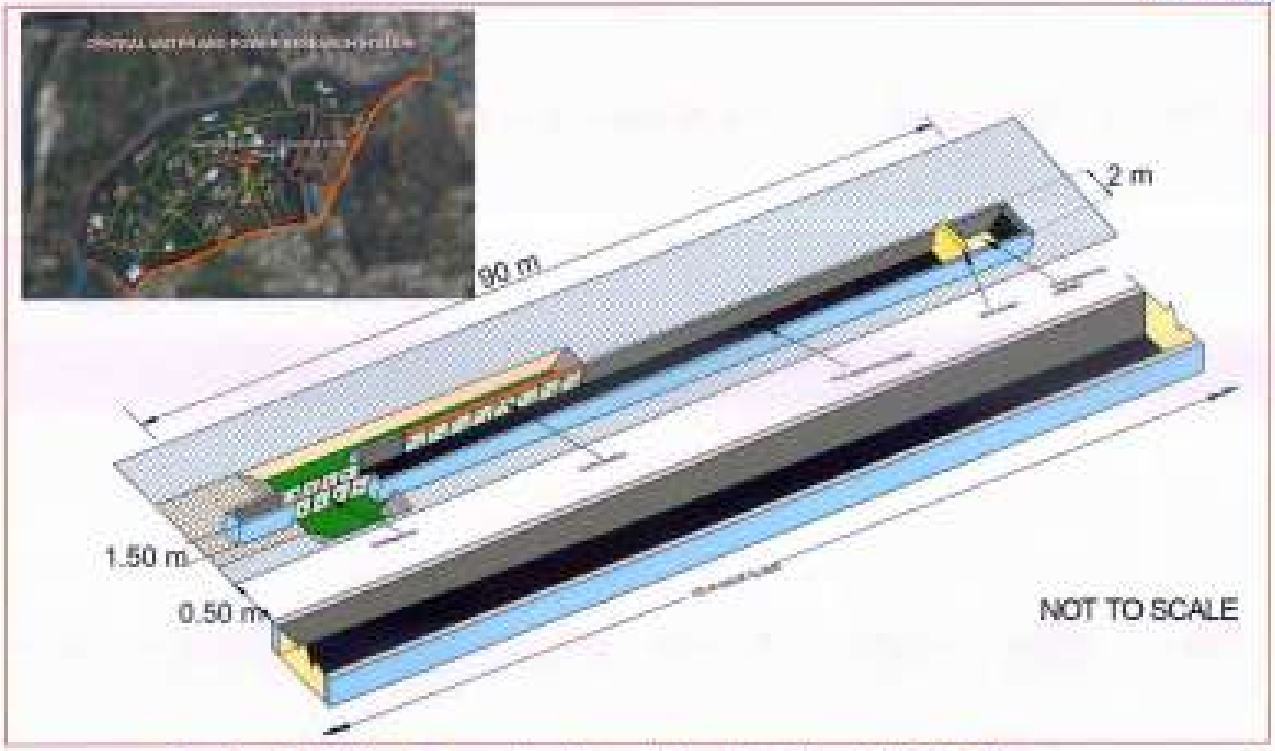


Fig. 6: Plan of Roundhead portion of Breakwater at -4.50 m Bed Level at Ajanur, Kasargod District, Kerala

Annexure I



Random Sea Wave Generation Flume (90 m) Facility at CWPRS, Pune

Annexure – II

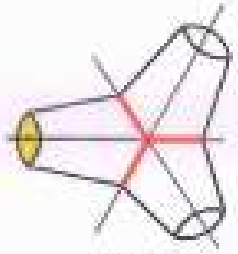
TETRAPOD SPECIFICATION

For 2 T Tetrapod

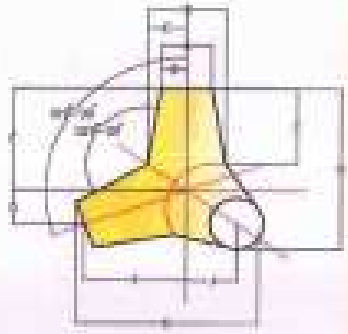
Wt. of Tetrapod	W =	2	T
Density of Concrete	w =	2.4	t/cu. m.
Vol. of Tetrapod	V =	0.830	Cu. meter
Overall dim. of Tetrapod	H =	1.400	meter

Dimensions of Armour Units in meter

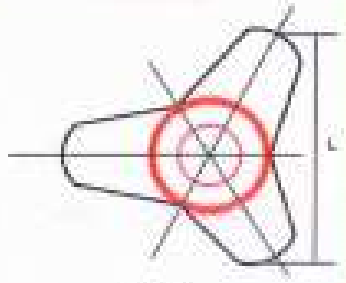
A	0.307*H	0.43
B	0.157*H	0.22
C	0.477*H	0.68
D	0.470*H	0.67
E	0.235*H	0.34
F	0.644*H	0.92
G	0.215*H	0.31
I	0.626*H	0.87
J	0.303*H	0.43
K	1.091*H	1.56
L	1.201*H	1.72



BOTTOM



ELEVATION



PLAN

Armour layer Thickness (2 Units) = 1.361 * H (Double Layer)

Lt = 1.900 meter

Placing Density (N)

Number Of Tetrapods (Two Layers, Random Placed) Per Unit Area

N = n * Kt * [1-P/100] * (w/W)**2/3

Where,

Layer coeff.	Kt =	1.04	constant
Porosity	P=	50	%
No. of Layers	n=	2	Nos.

N = 1.174 per sq. m. area

N = 117 per 100 sq. m. area

Specification for 2 t Tetrapod

Annexure – III

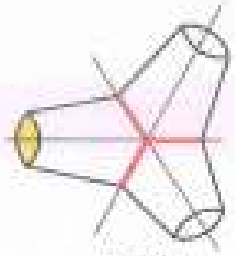
TETRAPOD SPECIFICATION

For 6 T Tetrapod

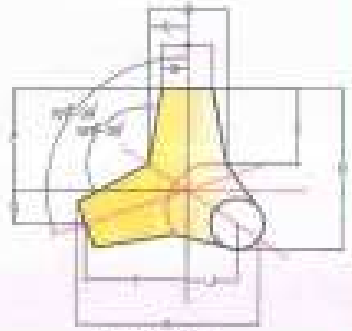
Wt. of Tetrapod	W =	6	T
Density of Concrete	w =	2.4	t/cu. m.
Vol. of Tetrapod	V =	2.500	Cu. meter
Overall dim. of Tetrapod	H =	2.059	meter

Dimensions of Armour Units in meter

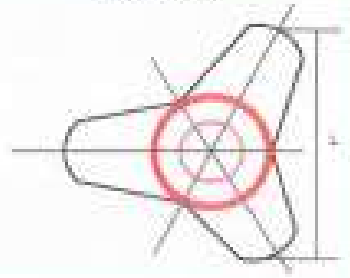
A	0.302*H	0.62
B	0.151*H	0.31
C	0.477*H	0.98
D	0.470*H	0.97
E	0.235*H	0.48
F	0.644*H	1.33
G	0.215*H	0.44
I	0.606*H	1.25
J	0.305*H	0.62
K	1.091*H	2.25
L	1.201*H	2.47



BOTTOM



ELEVATION



PLAN

Armour layer Thickness (2 Units) = 1.361 * H (Double Layer)
i.e = 2.803 meter

Packing Density (N)

Number Of Tetrapods (Two Layers, Random Placed) Per Unit Area

N = c * K? * (1-P/100) * [w/W]^2/3

Where,

Layer coeff.	K? =	1.04	constant
Porosity	P=	50	%
No. of Layers	n=	2	nos.

N =	0.555	per sq. m. area
N =	66	per 100 sq. m. area

Specification for 6 t Tetrapod

Annexure – IV

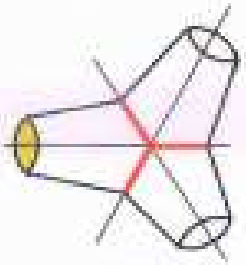
TETRAPOD SPECIFICATION

For 8 T Tetrapod

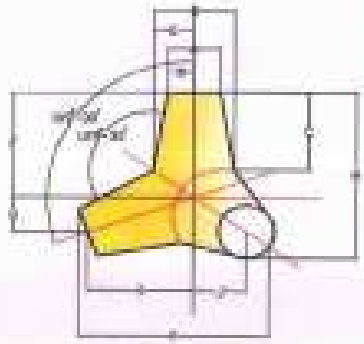
Wt. of Tetrapod	W =	8	T
Density of Concrete	w =	2.4	Ton. m.
Vol. of Tetrapod	V =	3.333	Cu. meter
Overall dim. of Tetrapod	H =	2.286	meter

Dimensions of Armour Units in meter

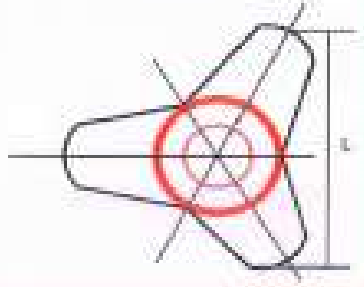
A	0.302*H	0.69
B	0.151*H	0.34
C	0.477*H	1.09
D	0.475*H	1.09
E	0.238*H	0.53
F	0.644*H	1.48
G	0.215*H	0.49
I	0.606*H	1.37
J	0.303*H	0.69
K	1.091*H	2.47
L	1.201*H	2.72



BOTTOM



ELEVATION



Armour layer Thickness (2 Units) = 1.301 * H (Double Layer)
i.e = 2.882 meter

Placing Density (N)

Number Of Tetrapods (Two Layers, Random Placed) Per Unit Area

N = n * KΔ * (1-P/100) * (w/W)^2/3

Where,

Layer coeff.	KΔ =	1.04	constant	N =	0.466 per sq. m. area
Porosity	P=	50	%	=	47 per 100 sq. m. area
No. of Layers	n=	2	nos.		

Specification for 8 t Tetrapod

Annexure - V



Photo 1: 90 m long RSWG wave flume facility at CWPRS



Photo 2: Random wave test with H_s = 4.05 m at DWL = +2.60 m



Photo 3: Random wave test with H_s = 4.85 m at DWL = +2.60 m (Endurance Test)



Photo 4: Random wave test with H_s = 4.0 m at MHHW = +1.40 m



Photo 5: Random wave test with H_s = 3.97 m at MSL = +1.00 m



Photo 6: Random wave test with H_s = 3.76 m at MLLW = +0.40 m



Photo 7: Regular wave test with H_{10} = 5.0 m at DWL = +2.60 m, t = 10 sec



Photo 8: Regular wave test with H_{10} = 5.12 m at MHHW = +1.40 m, t = 12 sec



Photo 9: Regular wave test with H_{10} = 5.0 m at MHHW = +1.40 m, t = 10 sec



Photo 10: Regular wave test with H_{10} = 5.0 m at MHHW = +1.40 m, t = 8 sec



Photo 11: Regular wave test with H_{10} = 5.07 m at MSL = +1.00 m, t = 10 sec



Photo 12: Regular wave test with H_s = 4.80 m at MLLW = +0.40 m, t = 10 sec

MATHEMATICAL MODEL STUDIES FOR LITTORAL DRIFT AND SHORELINE CHANGES DUE TO THE PROPOSED FISHERY HARBOUR AT AJANUR, DIST. KASARGOD, KERALA

Technical Report No.5357 **February 2016**

1. INTRODUCTION

Ajanur is one of the prominent fishing villages of Kasargod district with extensive fishing activity. The fishermen of this locality also used to carry out mechanized fishing in smaller scale. In order to meet the temporary needs of the fishermen of the area, a fish landing centre was constructed as part of ICAD project. Further, it is reported that there is a demand from the fishermen of nearby area of Chithari Kadapuram to construct a fish landing centre for them. All these indicate that the extensive fishing operation used to take place in these regions.

In preliminary studies, it is reported that the establishment of a fishery harbour at Ajanur would not only be essential for the development of the region but also beneficial to all the sections of fishermen communities and the fishery industry as a whole in the region resulting in major contributions to the economic development of the region. In view of this, mathematical model studies have been referred to CWPRS to access littoral drift distribution and changes in shoreline at the proposed location of the Ajanur fishing harbour.

The project site is situated near the estuary of Chithari backwaters in Kasargod taluka. The site is easily accessible from major roads through a network of coastal roads. The site is located about 18.0 km north-west of Cheruvatur fishery harbour and about 26.0 km south-east of Kasargod fishing harbour as shown in Fig.1.

2. SCOPE OF STUDIES

The scope of the work includes mathematical model studies for the

(i) Estimation of seasonal and annual littoral drift rates and their cross-shore distributions, and

(ii) Assessment of shoreline changes due to the proposed fishing harbour at Ajanur using LITPACK software.

3. PROPOSALS OF HARBOUR LAYOUT

Project Authorities have suggested three different layouts for the proposed fishing harbour at Ajanur. Brief description about these proposals is given as under. The breakwaters in all the three proposals are extended upto 4 m to 4.4 m depth.

Proposal 1: Layout 1 consists of a north breakwater of length 335 m. The southern breakwater is of total length as 610 m consisting of normal to the shore of length 270 m and further extended along the shore of length 340 m (Fig.2A).

Proposal 2: In Layout 2, the northern breakwater consists of shore normal length of 250 m further extended along the shore of length 315 m. The southern breakwater is of length 385 m (Fig.2B).

Proposal 3: In Layout 3, the northern breakwater of total length of 960 m consists of shore normal length of 260 m and along shore length of 700 m. The southern breakwater is of length 295 m (Fig.2C).

4. SITE CONDITIONS

4.1 Offshore wave climate

For simulation of littoral drift and shoreline changes, nearshore wave data is essential. Instrumentally observed wave data near the study area over a period of several years, if available, is the best suited for this purpose. However, if such data are not available, the nearshore wave climate can be obtained usually by transforming the offshore wave data to a nearshore location near the study area with the help of mathematical modeling technique. Due to unavailability of near shore wave data, generally the wave data observed by the ships plying in offshore region of Ajanur reported by India Meteorological Department (IMD) during the past 30 years were considered to arrive at nearshore wave data. The frequency distribution analysis of the offshore wave data for seasonal and annual periods was carried out as presented in Tables 1(A)-1(D). The corresponding wave rose diagrams are shown in Figs.3(A)-3(D).

From Table 1(A) and Fig.3(A), it could be seen that in the offshore region, the waves approach predominantly from SW and NW directions during south-west monsoon with the maximum wave height of the order of 4.5 m. During north-east monsoon period [Table 1(B) and Fig.3(B)], waves approach predominantly from NW and NE directions with the maximum wave height of the order of 3.0 m. In non-monsoon period [Table 1(C) and Fig.3(C)], the predominant directions of waves are WSW to North directions with the maximum wave height of the order of 3.0 m. The wave climate during the entire year [Table 1(D) and Fig.3(D)] indicates that the predominant wave directions in deep water are SW to NNE with the maximum wave height of the order of 4.5 m.

In order to get the nearshore wave climate, the deep water wave data were transformed at a location of -10 m depth contour near the site of the proposed fishery harbour of Ajanur using SW module of MIKE 21 software.

4.2 Tidal Levels and Currents

The proposed site of development is about 25 km south of Kasargod. Important tidal levels at Kasargod with respect to Chart Datum (as per Admiralty chart No.217 & 2029) are reported to be as under:

MHHW	:	1.4 m
MLHW	:	1.3 m
MSL	:	1.0 m
MHLW	:	0.9 m
MLLW	:	0.4 m

This indicates that the maximum tidal range at the study area is of the order of 1.0 m. Tidal currents are generally parallel to the coastline and directed northward during flood as well as ebb tide with the maximum magnitude of the order of 0.4 m/s.

4.3 Sediment Characteristics

Bed samples were collected from different locations at the proposed site at Ajanur (Fig.4). Based on the analyses of the bed samples, the bed material in the vicinity of the proposed site is mainly composed of medium to fine sand and silt, whose mean grain size, D_{50} varies from 0.05 mm to 0.6 mm.

4.4 Littoral Drift

Longshore sediment transport rates for Manjeshwar (Kerala) coastal regions are estimated and reported in CWPRS Technical Report No.4684. It is reported that the littoral drift having annual net transport of 0.3 million m^3 (southward) and the gross transport of 0.7 million m^3 occurs near Manjeshwar coastal region, which is about 50 km north of Ajanur. Several other literatures (Sajeev et al., 1997 and Sanilkumar et al., 2006) are available in which longshore sediment transport rate of nearby locations is mentioned. They estimated the annual net transport of 0.11 million cum (southward) and the gross transport of 0.26 million m^3 at Kozhikode, which is about 150 km south of Ajanur. Chandramohan et al. (1990) computed longshore transport along south Indian coast using Energy Flux Method (Shore Protection Manual, 1984). At Cochin, they predicted southward and northward longshore transport of 0.98 and 0.69 million m^3 respectively. Furthermore, it is mentioned here that the Energy Flux Method, in general, gives higher values of longshore transport

5. MODELLING TECHNIQUES

For these studies, mathematical models; MIKE 21 SW and LITPACK, were used for the simulation of nearshore wave field & wave disturbance near the location of the proposed fishery harbour at Ajanur. The MIKE 21 SW and LITPACK are the widely used commercial

software developed by Danish Hydraulics Institute (DHI), Denmark. Brief description of these models is given below:

5.1 MIKE 21 SW Model

For computation of wave transformation from deep water to nearshore region, MIKE 21 Spectral Wave (SW) model was used. The model is capable of simulating the growth, decay and transformation of wind generated waves and swells in both offshore and coastal areas. MIKE 21 SW is a new generation spectral wind-wave model based on unstructured meshes, which takes into account all the important phenomena like wave growth by influence of wind, non-linear wave-wave interaction, dissipations due to white-capping, bottom friction and depth-induced breaking. It can also model diffraction effects due to the presence of large structures which becomes increasingly important in the presence of coastal structures like breakwaters, groins etc. The effect of refraction and shoaling of waves due to depth variations and wave-current interaction are also considered in the model. The outputs of the model are the regular wave parameters which include the significant wave height, mean wave period, mean wave direction directional standard deviation and the wave radiation stresses. The governing equation used in the model is the wave action balance equation. The equation is solved using cell centred finite volume method. In horizontal Cartesian co-ordinates the conservation equation for wave action is

$$\frac{\partial N}{\partial t} + \nabla.(\vec{\nu} N) = \frac{S}{\sigma}$$

Where

$N(\vec{x}, \sigma, \theta, t)$	= the action density,
t	= time (sec),
$\vec{x}$ (x,y)	= Cartesian co- ordinates,
$\vec{\nu}$ (C_x, C_y, C_σ, C_θ)	= propagation velocity of a wave group in four dimensional phase space $\vec{x}$, σ and θ
S	= source term for the energy balance equation.
∇	= the four dimensional differential operator in $\vec{x}$, σ and θ.

5.2 LITPACK Software

In order to simulate littoral drift & its distribution, shoreline changes etc., LITPACK software was used. In LITPACK model, the cross-shore distribution of longshore current, wave height and setup for an arbitrary beach profile are computed by solving the longshore and cross-shore

momentum balance equations. The longshore current model includes effect of regular and irregular waves, influence of tidal currents, wind stress and non-uniform bottom friction, wave refraction, shoaling and breaking.

Calculation of longshore sediment transport is based on the local wave, current and sediment characteristics. The sediment transport model is an intra-wave period model, which takes into account time-varying distribution of both suspended load and bed load within the wave period in combined wave and current motion including the effect of wave breaking. The model gives cross-shore distribution of longshore sediment transport for an arbitrary, non-uniform bathymetry and sediment profile. The annual sediment budget is calculated based on the contribution of transport from each of the wave incidents occurring during the year. Thus the total annual drift is the sum of the contribution of transport from all incident waves.

Coastline evolution analyses are performed with the LITLINE module of LITPACK modelling system. LITLINE simulates the coastal response to gradients in the longshore sediment transport capacity resulting from natural features and a wide variety of coastal structures. LITLINE calculates the coastline evolution by solving a continuity equation for the sediment in the littoral zone. The influence of structures, sources and sinks are also included. The basic input data for running the model are the longshore relative coastline alignment, cross-shore profile description and bathymetry, active depth of transport and depth contour angles at each grid point, environmental data with wave properties, tidal currents and water levels position and size of structures etc.

6. WAVE TRANSFORMATION FROM DEEP SEA TO NEARSHORE LOCATION

Bathymetry in the offshore region of Ajanur is fairly simple, consists of almost parallel contours from -10 m depth upto -60 m depth. The bathymetric data in the offshore were taken from CMAP database. It could be seen from Fig.4 that the bed slope in the vicinity of the proposed fishery harbour is very mild (1:500). An area of 75 km alongshore and 20 km cross-shore with an unstructured mesh was considered for the simulation of MIKE 21 SW model. In the cross-shore, it extends from high water line near the shore to -60 m depth contour in deep sea. The model was run for incident waves of wave height 5.0 m for all the predominant wave directions in deep sea viz. SE, SSE, South, SSW, SW, WSW, West, WNW, NW, NNW and North.

Wave heights and wave directions, at -10 m depth contour near the location of the proposed fishery harbour were extracted from the model results for all the incident wave directions. The extracted information of wave heights and directions at -10 m depth contour was applied to

seasonal and yearly offshore wave climate to obtain frequency distribution of wave heights and wave directions near the location of the proposed fishery harbour at Ajanur.

6.1 Transformation Table

Wave climate at the offshore zone was transformed to a nearshore location called as Refraction Point (Fig.5) at -10 m depth contour near the proposed fishery harbour site at Ajanur. The MIKE 21 SW model was simulated for a significant wave height (Hs) of 5 m and a significant wave period (Ts) of 10 sec occurring at offshore boundaries. The transformation table was applied to the deep water wave data [Table 1(A) - 1(D)] to obtain the frequency distribution of waves at the nearshore Refraction Point (at –10 m depth contour) for SW monsoon, NE monsoon, non-monsoon and annual periods. The nearshore wave climate obtained for SW monsoon, NE monsoon, Non-monsoon and Annual periods are shown in Tables 2(A)-2(D), which indicate the frequency distribution of the wave heights and directions. The corresponding wave rose diagrams are shown in Figs.6(A)-5(D).

The transformation table obtained from deep water to the Refraction Point at -10 m depth contour using MIKE 21 SW model for wave propagation is given below:

WAVE TRANSFORMATION FROM DEEP TO SHALLOW WATER AT –10 m DEPTH CONTOUR NEAR THE PROPOSED HARBOUR AT AJANUR

Wave Direction(^{0} N)		Ratio of inshore wave height to offshore wave height (Hi/Ho)
offshore	Inshore	
0	301.4	0.187
22.5	303	0
45	303	0
67.5	0	0
90	0	0
112.5	209.2	0
135	209	0.206
157.5	211.2	0.373
180	215.7	0.543
202.5	223.6	0.666
225	235.6	0.73
247.5	249.8	0.746
270	264.4	0.723
292.5	278.4	0.643
315	289.6	0.506
337.5	297	0.34
360	301.4	0.187

6.2 Nearshore Wave Climate

From Table 2(A) and Fig.6(A) it could be observed that in the nearshore region, the waves having the maximum wave height of the order of 3.5 m approach predominantly from West, WSW and SW directions with percentage of occurrence 59%, 15% and 13% respectively during south-west monsoon. During the NE monsoon period [Table 2(B) and Fig.6(B)], waves having the maximum wave height of the order of 3.0 m approach predominantly from West, WNW, WSW and SW directions with the percentage of occurrence of 11%, 22%, 7% and 13% respectively. In the non-monsoon period [Table 2(C) and Fig.6(C)], the predominant directions of waves having maximum wave height of the order of 3.0 m are from WNW and West predominant directions with percentage occurrence of 37% and 12% respectively. The wave climate during the entire year [Table 2(D) and Fig. 6(D)] indicates that the predominant wave directions are from WNW, West and SW with the maximum wave height of the order of 3.5 m and the percentage occurrence of 21%, 26% and 12% respectively for the annual period.

7. SIMULATION OF LITTORAL DRIFT AND SHORELINE CHANGES

LITPACK model is used to estimate seasonal/ annual littoral drift rates and its distribution on the profile normal to the shoreline. The model assumes the depth contours parallel to the seashore. Fig.7 shows the beach profile (cross-shore bed profile) near the location of the proposed harbour at Cochin which is used for the littoral drift computation. Profile covers a distance of 3.5 km extending upto about -10 m depth contour. It could be seen from the figure that -5 m depth contour is about 1.0 km from the coastline. Profile is discretised into 350 grid points with uniform grid size of 10 m. Littoral drift at the proposed site of Ajanur was simulated using LITDRIFT module of LITPACK, which takes into account the cross-shore profile, the sediment characteristics and the wave climate as input.

7.1 Littoral Drift

The general orientation of the coastline at the proposed site is NW-SE making an angle of about 335^0 with respect to north. Further, depending on the wave direction with respect to the coastline, the littoral drift will be either directed northward or southward along the shoreline. The model was simulated for the cross-shore profiles for the seasonal and the annual wave climates as mentioned in Tables 2(A)-2(D).

Based on the simulation of littoral drift, the annual net and the gross transports were estimated to be of the order of 0.413 and 0.649 million m^3 respectively. The model was also used to compute seasonal transport rates. The distribution of littoral transport rates for the three seasons and for the annual period as shown in Figs.8(A)-8(D). It may be noted that the northward drift is indicated as negative and the southward drift is indicated as positive in the

figures. From Fig.8(A) it could be seen that during SW monsoon, southward transport is more than the northward transport and the transport occurs within a range of 500 m from the shoreline. It could also be seen that main drift moves within a range of 200 m from coastline. From Fig.8(B) it could be seen that during NE monsoon, northward transport is more than southward transport and the transport is mainly confined to a range of 150 m from the shoreline. During non-monsoon period, the southward transport equals the northward transport and the major transport occurs within a range of 150 m from the shoreline as shown in Fig.8(C). The distribution of annual transport, shown in Fig.8(D), indicates that the sediment drift moves within a range of 500 m from the shoreline as the cross-shore profile has steep slope. Further, it could be seen that the southward transport is significantly more than the northward transport during SW monsoon season. It could also be seen that the peak transport occurs at about 50 m from the shoreline and about 75% transport occurs between 50 m to 150 m from shoreline i.e. between +0.0 to –3.5 m depth contours.

Annual and seasonal net and gross littoral drift were estimated using LITDRIFT model. The northward and the southward drift are calculated based on the gross and the net littoral drift. The littoral drifts are reported in the following table:

TRANSPORT RATES (million cum)

Period	Northward	Southward	Net	Gross
SW monsoon	0.0795	0.511	-0.431	0.590
NE monsoon	0.021	0.016	0.0057	0.037
Non-monsoon	0.025	0.025	0.0	0.05
Annual	0.118	0.531	-0.413	0.649

It could be seen from the table that the annual northward and southward drift are 0.118 million cum and 0.531 million cum respectively while the net and the gross transports are 0.413 million cum and 0.649 million cum respectively. The net transport is towards south. It is also observed that the major southward transport occurs during SW monsoon.

7.2 SHORELINE EVOLUTION

For the shoreline evolution model, a shoreline of 8.0 km length was considered. The length was divided into 800 grid points with uniform grid size of 10 m. The proposed location of the Ajanur fishing harbour was schematically located in the middle of the coastline. Projection of the breakwater was taken for the computation of shoreline evolution. It was seen that the projection adopted was found to be appropriate for all the three proposals (Figs.2A-2C) given by the Project Authorities. The transport rates were computed for the above mentioned profile,

which was used as input to the shoreline evolution model for LITLINE module of LITPACK software.

In order to calibrate the model, the existing profile along with shoreline was considered. The model was simulated for SW monsoon period and it was found that the model results match well with the figure seen in Google earth map. Field observed shoreline data collected near the proposed location of fishery harbour during the different months of the year 2013 (May, July-September) and 2014-15 (July 2014 to February 2015) was provided by the project authority. During the given period in the year 2013, it was observed that the maximum deposition of the order of 0.2 m in the south of the gut and the erosion of about 0.03 m in the north of the gut had occurred. Further, in the year 2014, similar trend was observed, however, the magnitude of the deposition and the erosion were marginally less. Based on these data, it can be concluded that a net littoral drift of mild magnitude in north direction exists in the study area. The phenomena of deposition and erosion could be observed at the study area due to the presence of shoals near the gut.

The calibrated model was used to simulate for the proposed condition in which layout of the proposed fishing harbour was incorporated in the model. The model was run with the schematic layout for a period of 10 years. The predicted shoreline change obtained from the model simulation is shown in Fig.9. As the net transport is directed towards south, the deposition on the north side of the extended groyne is noticed while on the southern side erosion is observed.

Further, model was simulated subsequently for a period of 2, 4, 6, 8 and 10 years and the maximum cross-shore advancement for each period would be obtained as 34 m, 44 m, 52 m, 60 m and 68 m respectively from the prevailing coastline position on the northern side of the proposed north breakwater. It may be noted that during the LITPACK model simulation, it has been assumed that the shoreline consisted of erodible material. Further, the corresponding longshore effect of deposition was felt for a length of about 2500 m. The maximum cross-shore erosion of the shoreline in 10 years period would be of the order of 40 m south of the southern breakwater with longshore effect would occur upto about 1500 m from the proposed position of the southern breakwater.

The model results presented herein are based on the simulation with considering the effect of the River Chithari draining in the north of the proposed location of the fishing harbour. It was assumed that the quantity of water and sediment discharged from the river was extremely low and their effect on the littoral drift and on the shoreline is insignificant.

8. CONCLUSIONS

Mathematical model studies have been carried out to estimate littoral drift at the proposed site of Ajanur fishing harbour, Kerala and to examine the likely changes in the coastline due to the proposed northern and southern breakwaters. Following are the main conclusions of the model studies:

1. The annual southward and northward transports are computed to be 0.531 million cum and 0.118 million cum respectively with the net and the gross transports being 0.413 million cum and 0.649 million cum respectively. The net longshore transport is towards south. Also, the major southward transport occurs during SW monsoon.

2. Based on the distribution of annual longshore transport, the transport is confined within a range of 500 m from the shoreline and the southward transport is more than the northward transport. The peak transport occurs at about 50 m from the shoreline and about 75% transport occurs in the range of 50 m to 150 m from shoreline i.e. between +0.0 m to – 3.5 m depth contours.

3. As the net transport is directed towards south, the deposition is expected on the north side of the proposed northern breakwater. After a period of 2, 4, 6, 8 and 10 years, the maximum cross-shore advancement would be about 34 m, 44 m, 52 m, 60 m and 68 m respectively from the prevailing coastline position. The corresponding longshore effect on northern side of the proposed northern breakwater would be felt upto 2500 m.

4. In 10 years period, erosion on the southern side of the proposed southern breakwater would be limited upto 40 m in cross-shore direction and its effect in longshore direction would be extended upto 1500 m in the south of the proposed southern breakwater.

5. Appropriate coastal protection measures need to be adopted on the southern coastline of Ajanur.

9. REFERENCES

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TABLE 1(A) : FREQUENCY OF OCCURANCE (%) OF WAVE HEIGHT & DIRECTION OFF AJANUR SOUTH-WEST MONSOON (JUN-SEPT)

WAVE HT(m)	0.5	1	1.5	2	2.5	3	3.5	4	4.5	TOTAL
DIRECTION									CALM %	0.56
22.5	0.09	0	0.18	0	0	0	0	0	0	0.27
45	0	0	0.12	0	0	0	0	0	0	0.12
67.5	0	0	0.12	0	0.13	0	0	0	0	0.25
90	0	0.09	0.07	0	0.08	0.07	0	0	0	0.31
112.5	0	0	0.17	0.15	0	0.12	0	0	0	0.44
135	0.14	0.11	0.18	0.37	0.29	0.34	0	0.23	0	1.67
157.5	0.22	0.25	0.42	0.05	0.19	0.21	0	0.23	0.03	1.6
180	0.06	0.27	0.4	0.66	0.13	0.15	0.06	0.41	0.18	2.32
202.5	0.3	0.15	0.51	0.34	0.24	0.2	0.21	0.23	0	2.17
225	0.51	1.08	1.49	1.59	1.11	0.93	0.71	0.33	0.21	7.97
247.5	0.58	2.02	2.09	3.72	1.63	1.72	0.82	1.17	0.71	14.46
270	1.43	5.03	4.48	5.58	4.8	6.08	3.15	4.19	2.91	37.66
292.5	0.84	2.47	3.89	4.11	3.01	2.94	1.15	1.27	1.65	21.33
315	0.14	0.88	1.16	2.09	1.07	0.72	0.04	0.21	0.48	6.77
337.5	0.18	0.6	0.33	0.36	0.08	0.08	0	0	0	1.63
360	0.3	0.07	0	0.09	0	0	0	0	0	0.46

TABLE 1(B) : FREQUENCY OF OCCURANCE (%) OF WAVE HEIGHT & DIRECTION OFF AJANUR NORTH-EAST MONSOON (OCT-JAN)

WAVE HT(m)	0.5	1	1.5	2	2.5	3	3.5	4	4.5	TOTAL
DIRECTION									CALM %	0.86
22.5	1.95	2.41	0.95	1.06	0.28	0.16	0	0.1	0	6.91
45	2.22	2.6	1.9	1.81	0.04	0.24	0	0.1	0.11	9.03
67.5	1.88	2.71	1.94	0.75	0.33	0.22	0.14	0	0	7.96
90	2.69	3.23	1.71	0.84	0.19	0.43	0.07	0	0	9.17
112.5	1.55	2	0.98	0.8	0.08	0.35	0.1	0	0	5.87
135	0.56	1.45	0.61	0.48	0.03	0.44	0.1	0	0	3.67
157.5	0.52	0.78	0.99	0.51	0.09	0.22	0.1	0.03	0	3.26
180	1.19	1.7	1.17	0.97	0.38	0.07	0	0.17	0	5.65
202.5	0.97	0.5	1.03	0.92	0.25	0.21	0.08	0	0	3.97
225	0.5	1.17	0.77	0.65	0.46	0.04	0.13	0	0.1	3.82
247.5	0.9	1.82	1.57	0.83	0.69	0.75	0.1	0	0	6.67
270	0.65	1.82	1.31	1.5	0.17	0.41	0	0	0	5.87
292.5	1.21	1.48	1.63	0.67	0.13	0.19	0	0.1	0	5.41
315	1.15	2.04	0.99	0.47	0.34	0	0	0	0	4.98
337.5	1.96	2.77	1.61	0.8	0.11	0.1	0	0	0	7.35
360	2.51	3.58	1.73	1.37	0.12	0.22	0	0	0	9.53

TABLE 1(C): FREQUENCY OF OCCURANCE (%) OF WAVE HEIGHT & DIRECTION OFF AJANUR NON-MONSOON (FEB-MAY)

WAVE HT(m)	0.5	1	1.5	2	2.5	3	3.5	4	4.5	TOTAL
DIRECTION									CALM %	1.14
22.5	2.3	2.82	1.12	1.01	0.36	0.1	0.16	0.12	0.05	8.04
45	2.1	1.4	0.89	0.38	0.13	0.17	0.37	0.37	0	5.81
67.5	0.62	1.34	0.22	0.04	0	0.22	0	0.15	0	2.59
90	0.87	1.48	0.47	0.6	0	0	0	0.28	0	3.69
112.5	0.84	1.33	0.6	0.4	0	0	0	0.05	0	3.21
135	1.13	1.9	0.86	0.26	0.01	0	0	0.25	0	4.41
157.5	1.58	1.03	1.62	0.62	0.25	0.11	0.04	0.04	0	5.32
180	1.06	1.98	0.88	0.76	0.07	0.07	0.17	0.1	0	5.08
202.5	0.54	0.55	0.96	0.95	0.05	0.16	0.05	0	0	3.25
225	0.98	1.09	0.4	0.61	0.34	0.15	0.26	0.12	0.12	4.07
247.5	0.74	1.02	1.13	1.24	0.23	0.11	0	0.1	0.03	4.61
270	1.3	2.1	0.81	1.19	0.07	0.48	0	0.11	0.08	6.15
292.5	1.68	2.07	1.24	0.4	0.33	0.27	0	0	0	5.99
315	3.45	3.18	1.57	0.85	0.45	0.16	0	0	0	9.64
337.5	3.57	4.88	2.78	1.02	0.04	0.15	0	0.19	0.11	12.73
360	4.78	4.99	2.28	1.1	0.31	0.12	0.3	0.2	0.18	14.25

TABLE 1(D) : FREQUENCY OF OCCURANCE (%) OF WAVE HEIGHT & DIRECTION OFF AJANUR ENTIRE PERIOD (JAN-DEC)

WAVE HT(m)	0.5	1	1.5	2	2.5	3	3.5	4	4.5	TOTAL
DIRECTION									CALM %	6.34
22.5	1.3	1.61	0.71	0.62	0.19	0.08	0.05	0.07	0.01	4.64
45	1.29	1.26	0.9	0.67	0.05	0.12	0.11	0.13	0.03	4.57
67.5	0.75	1.26	0.71	0.26	0.14	0.13	0.04	0.04	0	3.35
90	1.06	1.5	0.75	0.48	0.1	0.15	0.02	0.08	0	4.15
112.5	0.72	1.04	0.57	0.43	0.04	0.14	0.03	0.02	0	2.98
135	0.56	1.07	0.56	0.37	0.12	0.24	0.03	0.14	0	3.08
157.5	0.7	0.68	0.96	0.42	0.19	0.18	0.05	0.09	0.01	3.28
180	0.69	1.22	0.78	0.76	0.2	0.1	0.07	0.2	0.06	4.08
202.5	0.54	0.4	0.78	0.68	0.18	0.18	0.1	0.07	0	2.93
225	0.6	1.03	0.86	0.9	0.6	0.36	0.33	0.15	0.13	4.97
247.5	0.66	1.51	1.52	1.86	0.86	0.84	0.31	0.41	0.23	8.21
270	1.02	2.73	2.15	2.76	1.73	2.26	1.01	1.37	0.91	15.94
292.5	1.12	1.88	2.14	1.74	1.17	1.12	0.4	0.46	0.5	10.52
315	1.42	1.91	1.23	1.13	0.61	0.29	0.02	0.07	0.14	6.83
337.5	1.7	2.58	1.5	0.71	0.09	0.1	0	0.05	0.03	6.77
360	2.24	2.65	1.26	0.78	0.14	0.1	0.09	0.06	0.05	7.37

TABLE 2(A) : FREQUENCY OF OCCURANCE (%) OF WAVE HEIGHT & DIRECTION AT AJANUR (10m DEPTH) SOUTH-WEST MONSOON (JUN-SEPT)

WAVE HT(m)	0.5	1	1.5	2	2.5	3	3.5	4	4.5	TOTAL
DIRECTION									CALM %	1.95
22.5	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0
67.5	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0
112.5	0	0	0	0	0	0	0	0	0	0
135	0	0	0	0	0	0	0	0	0	0
157.5	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0
202.5	1.27	1.52	0.44	0.03	0	0	0	0	0	3.26
225	0.87	2.41	4.21	1.76	1.73	1.27	0.21	0	0	12.46
247.5	0.58	2.02	5.81	1.63	1.72	1.99	0.71	0	0	14.46
270	2.27	11.39	14.17	10.75	7.23	10.26	2.91	0	0	58.98
292.5	1.38	2.81	3.24	0.76	0.69	0	0	0	0	8.88
315	0	0	0	0	0	0	0	0	0	0
337.5	0	0	0	0	0	0	0	0	0	0
360	0	0	0	0	0	0	0	0	0	0

TABLE 2(B) : FREQUENCY OF OCCURANCE (%) OF WAVE HEIGHT & DIRECTION AT AJANUR (10m DEPTH) NORTH-EAST MONSOON (OCT-JAN)

WAVE HT(m)	0.5	1	1.5	2	2.5	3	3.5	4	4.5	TOTAL
DIRCETION									CALM %	39.78
22.5	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0
67.5	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0
112.5	0	0	0	0	0	0	0	0	0	0
135	0	0	0	0	0	0	0	0	0	0
157.5	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0
202.5	4.4	2.16	0.35	0	0	0	0	0	0	6.91
225	2.66	5.57	3.69	0.99	0.29	0.13	0.1	0	0	13.43
247.5	0.9	1.82	2.4	0.69	0.75	0.1	0	0	0	6.66
270	1.86	4.93	3.48	0.49	0.41	0.1	0	0	0	11.27
292.5	15.19	5.77	0.91	0	0	0	0	0	0	21.87
315	0	0	0	0	0	0	0	0	0	0
337.5	0	0	0	0	0	0	0	0	0	0
360	0	0	0	0	0	0	0	0	0	0

TABLE 2(C) : FREQUENCY OF OCCURANCE (%) OF WAVE HEIGHT & DIRECTION AT AJANUR (10m DEPTH) NON-MONSOON (FEB-MAY)

WAVE HT(m)	0.5	1	1.5	2	2.5	3	3.5	4	4.5	TOTAL
DIRECTION									CALM %	24.5
22.5	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0
67.5	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0
112.5	0	0	0	0	0	0	0	0	0	0
135	0	0	0	0	0	0	0	0	0	0
157.5	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0
202.5	6.76	2.75	0.19	0	0	0	0	0	0	9.7
225	2.58	5.46	2.79	0.79	0.3	0.38	0.12	0	0	12.42
247.5	0.74	1.02	2.37	0.23	0.11	0.1	0.03	0	0	4.6
270	2.98	5.41	2.4	0.67	0.48	0.11	0.08	0	0	12.13
292.5	25.36	9.39	1.64	0.27	0	0	0	0	0	36.66
315	0	0	0	0	0	0	0	0	0	0
337.5	0	0	0	0	0	0	0	0	0	0
360	0	0	0	0	0	0	0	0	0	0

TABLE 2(D) : FREQUENCY OF OCCURANCE (%) OF WAVE HEIGHT & DIRECTION AT AJANUR (10m DEPTH) ENTIRE PERIOD (JAN-DEC)

WAVE HT(m)	0.5	1	1.5	2	2.5	3	3.5	4	4.5	TOTAL
DIRECTION									CALM %	26
22.5	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0
67.5	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0
112.5	0	0	0	0	0	0	0	0	0	0
135	0	0	0	0	0	0	0	0	0	0
157.5	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0
202.5	3.94	2.1	0.32	0.01	0	0	0	0	0	6.37
225	1.83	4.21	3.4	1.13	0.72	0.55	0.13	0	0	11.97
247.5	0.66	1.51	3.38	0.86	0.84	0.72	0.23	0	0	8.2
270	2.14	6.75	6.65	4.02	2.66	3.34	0.91	0	0	26.47
292.5	12.77	5.74	1.89	0.34	0.21	0	0	0	0	20.95
315	0	0	0	0	0	0	0	0	0	0
337.5	0	0	0	0	0	0	0	0	0	0
360	0	0	0	0	0	0	0	0	0	0



Fig.1 Location Map of Ajanur Coastal Area

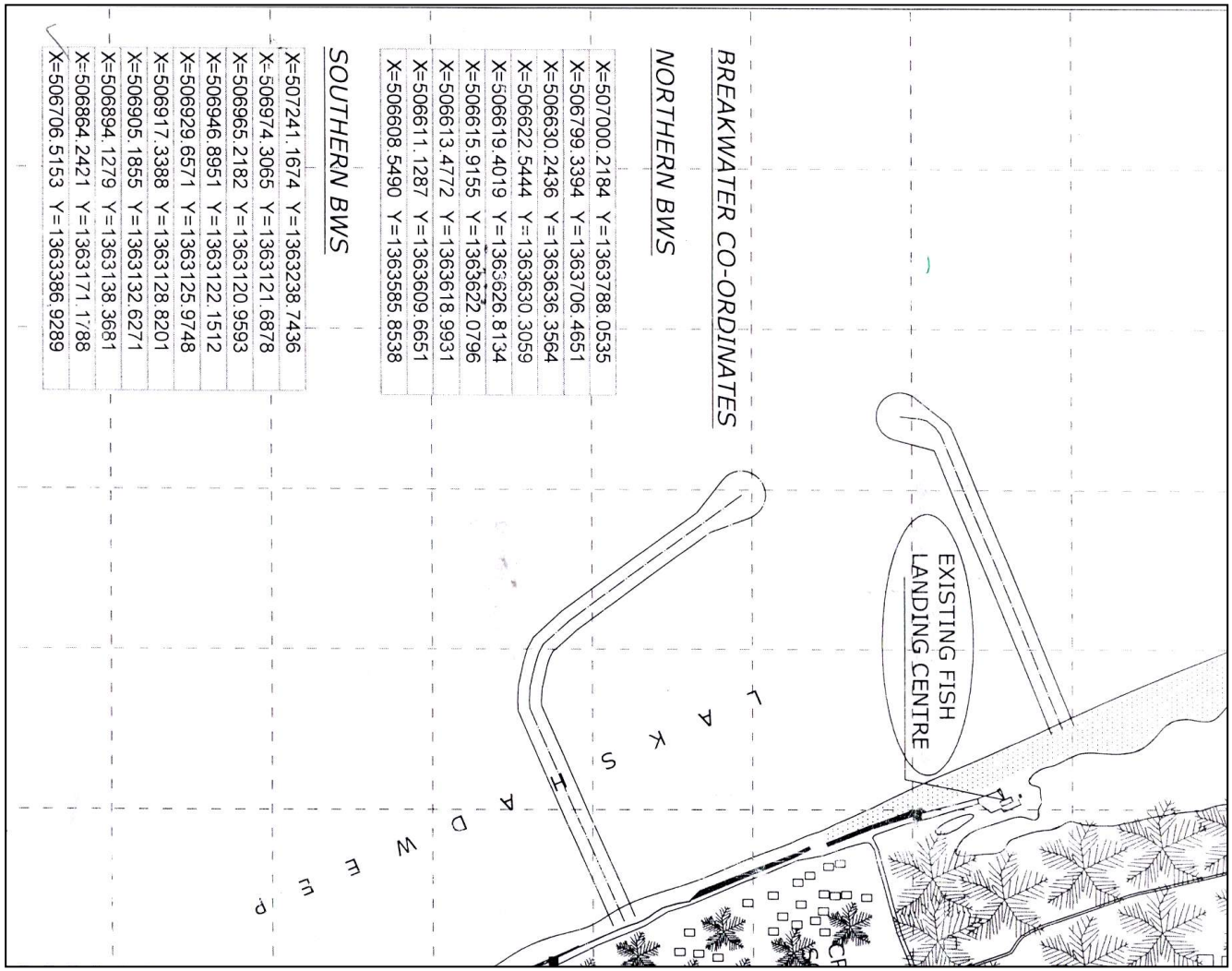


Fig.2(A) Proposed Layout - 1 of Fishing harbour at Ajanur

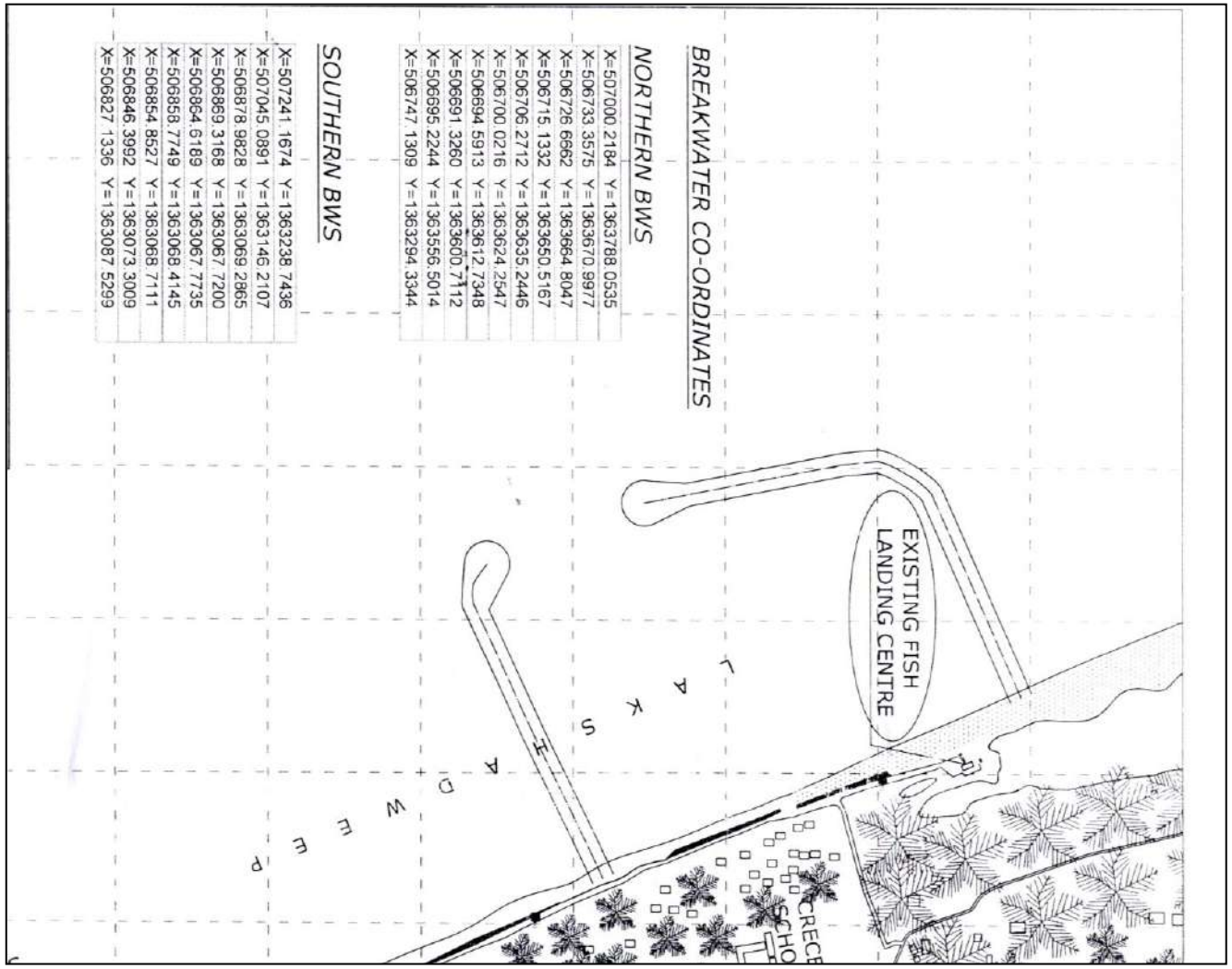


Fig.2(B) Proposed Layout - 2 of Fishing harbour at Ajanur

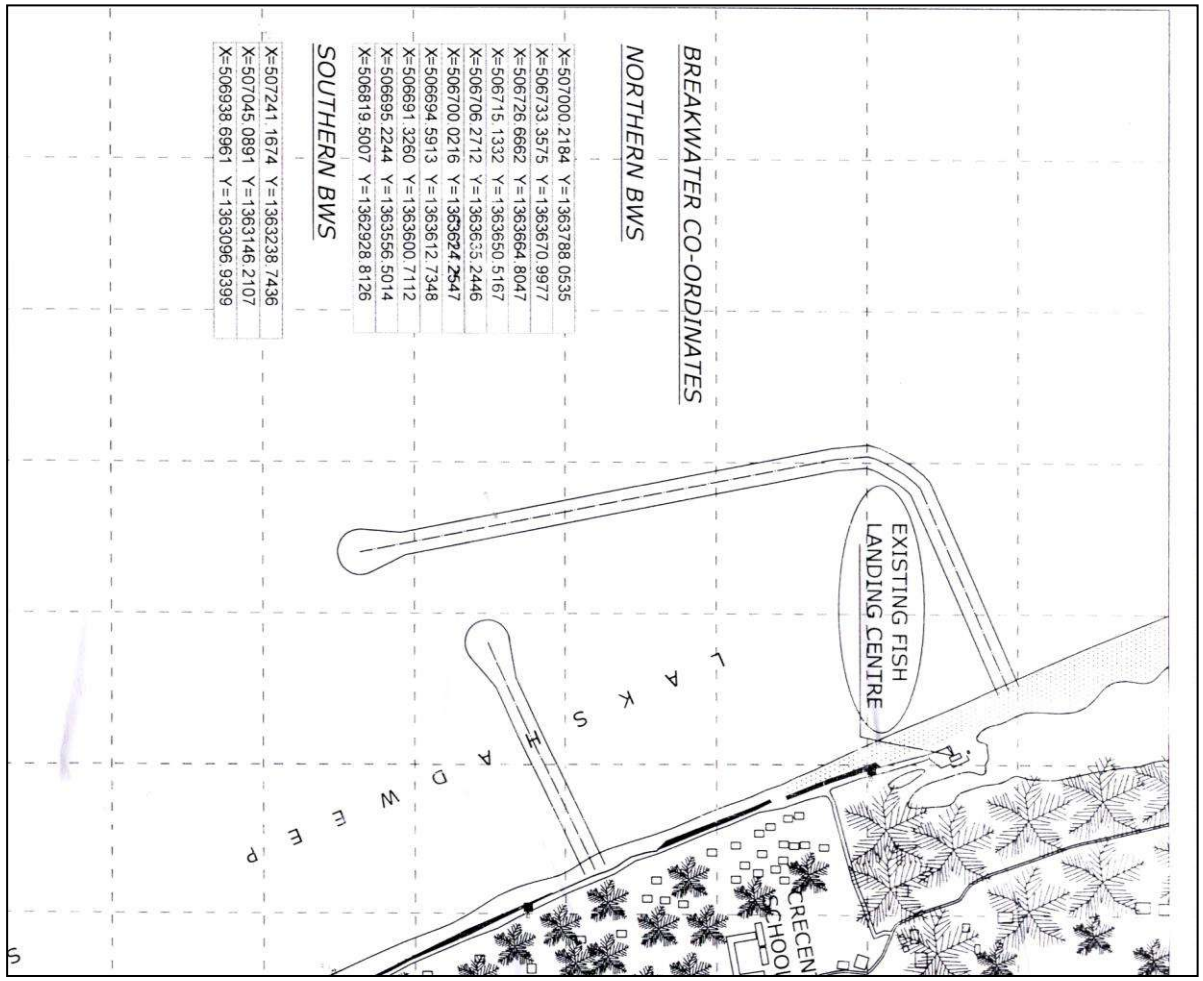


Fig.2(C) Proposed Layout - 3 of Fishing harbour at Ajanur

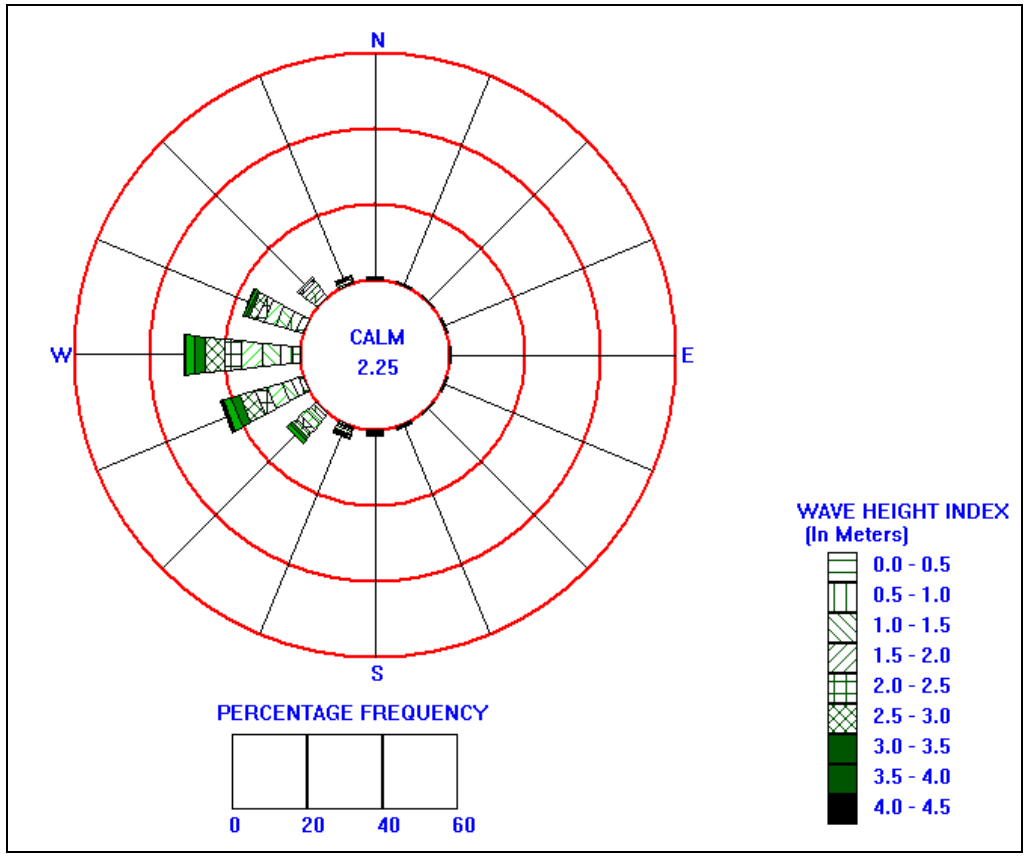


Fig.3(A) Rose Diagram For Wave Heights Off Ajanur For SW Monsoon Period (Jun-Sep)

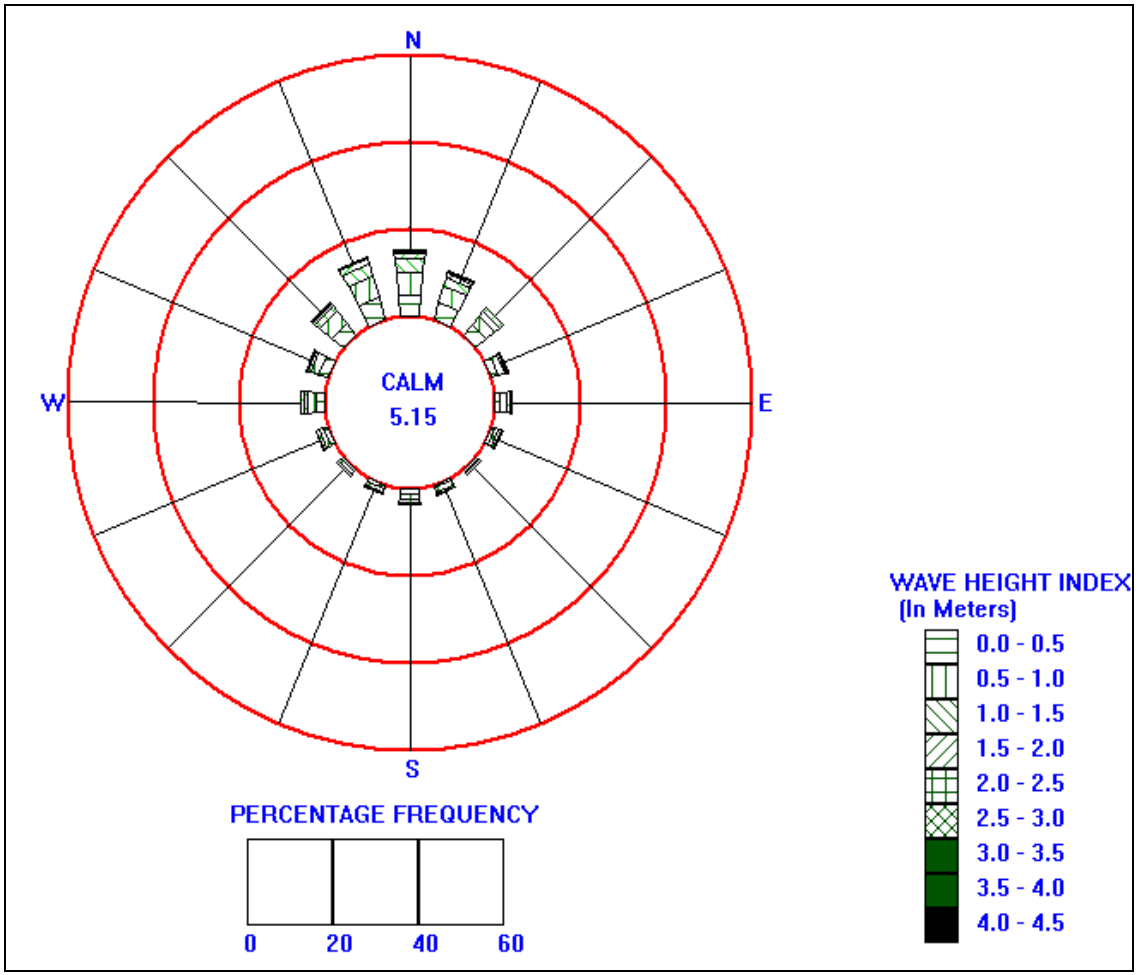


Fig.3(B) Rose Diagram for Wave Heights Off Ajanur for NE Monsoon Period (Oct-Jan)

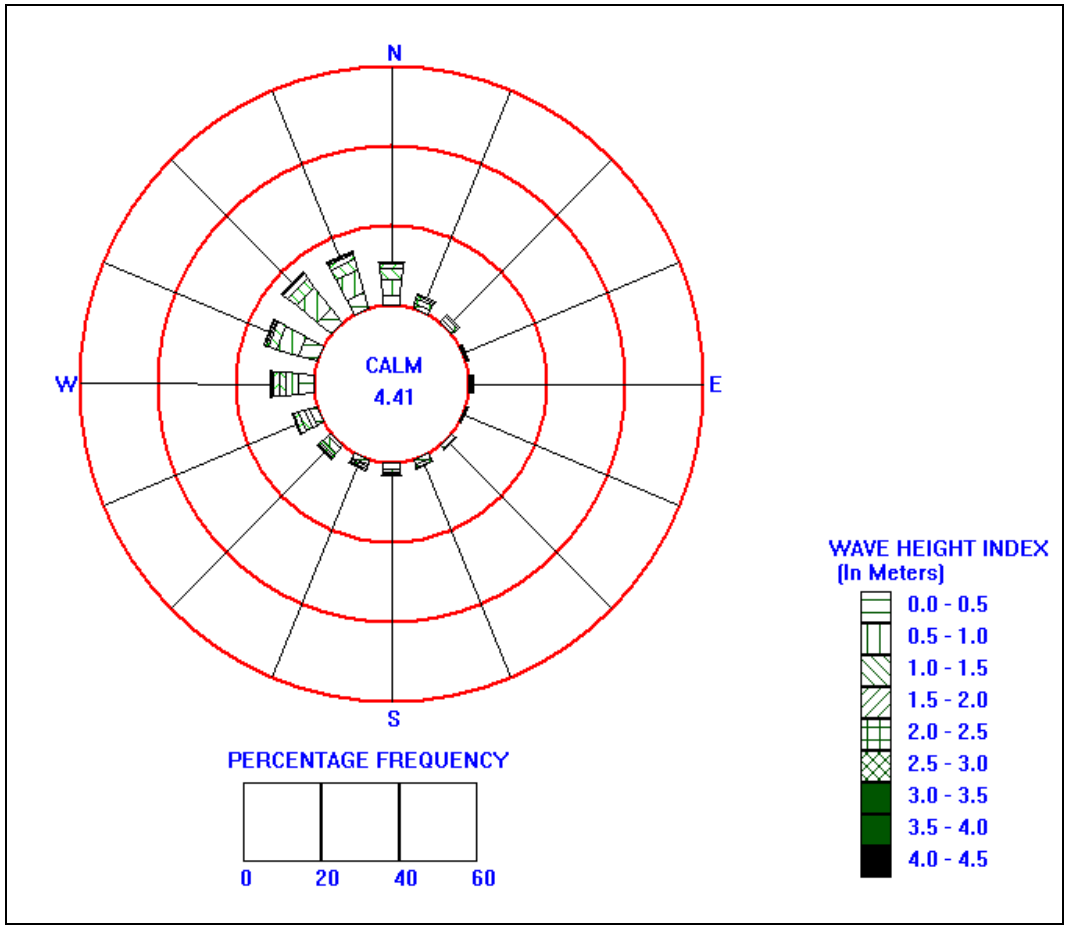


Fig.3(C) Rose Diagram for Wave Heights Off Ajanur for Non-Monsoon Period (Feb-May)

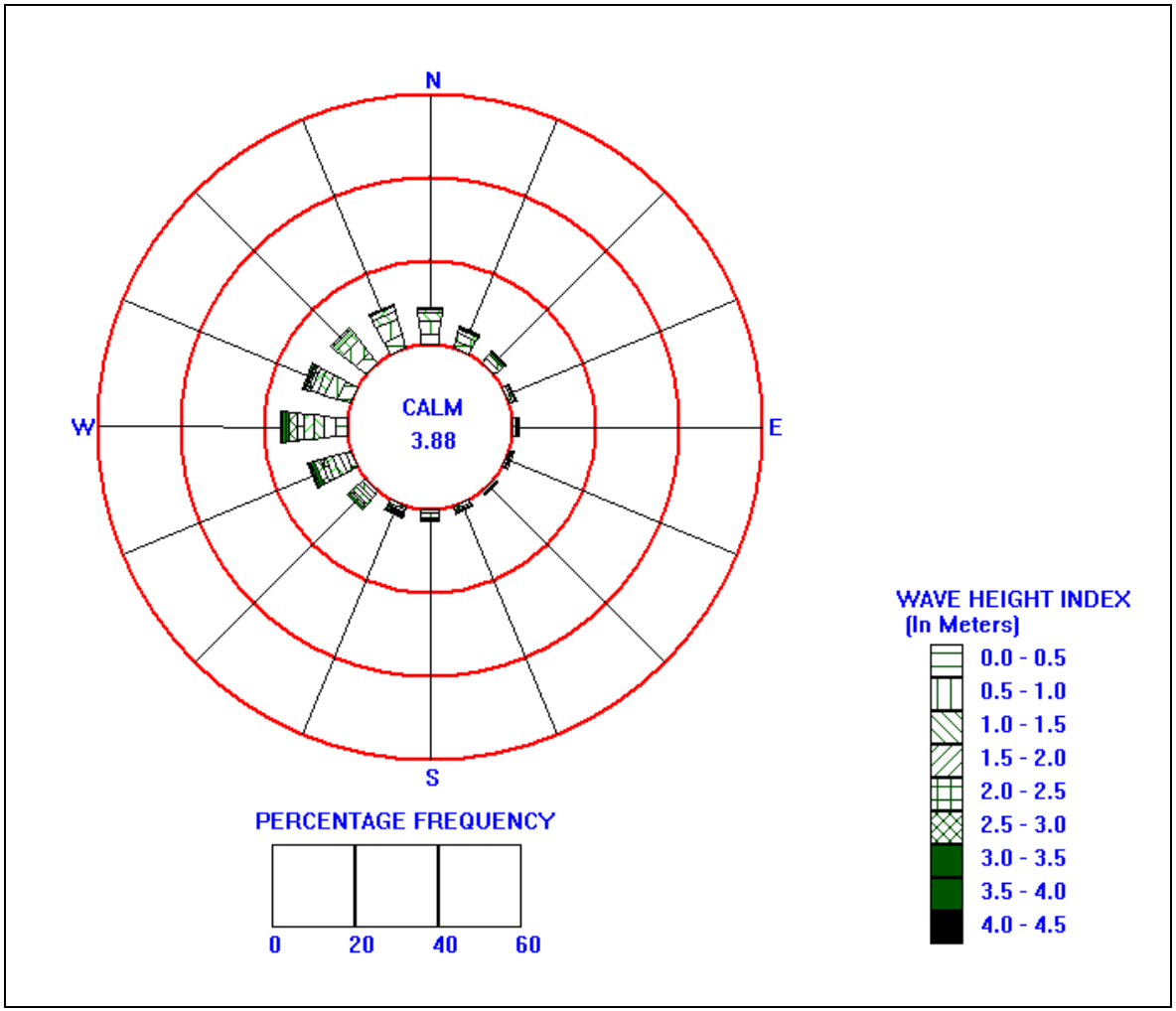
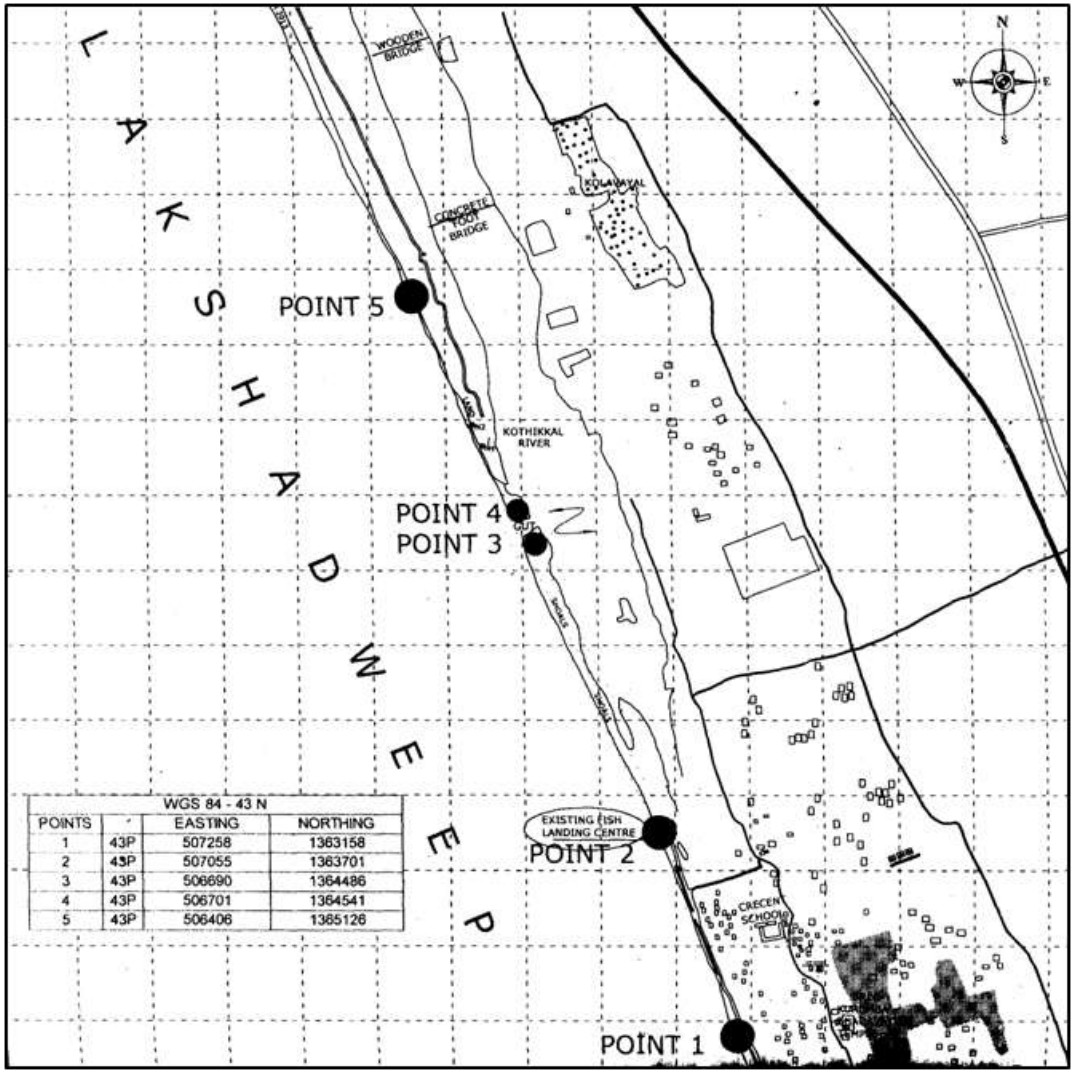


Fig.3(D) Rose Diagram for Wave Heights Off Ajanur for Annual Period (Jan-Dec)



WGS 84 - 43 N			
POINTS		EASTING	NORTHING
1	43P	507258	1363158
2	43P	507055	1363701
3	43P	506690	1364486
4	43P	506701	1364541
5	43P	506406	1365126

Fig.4 Locations of bed sample collection

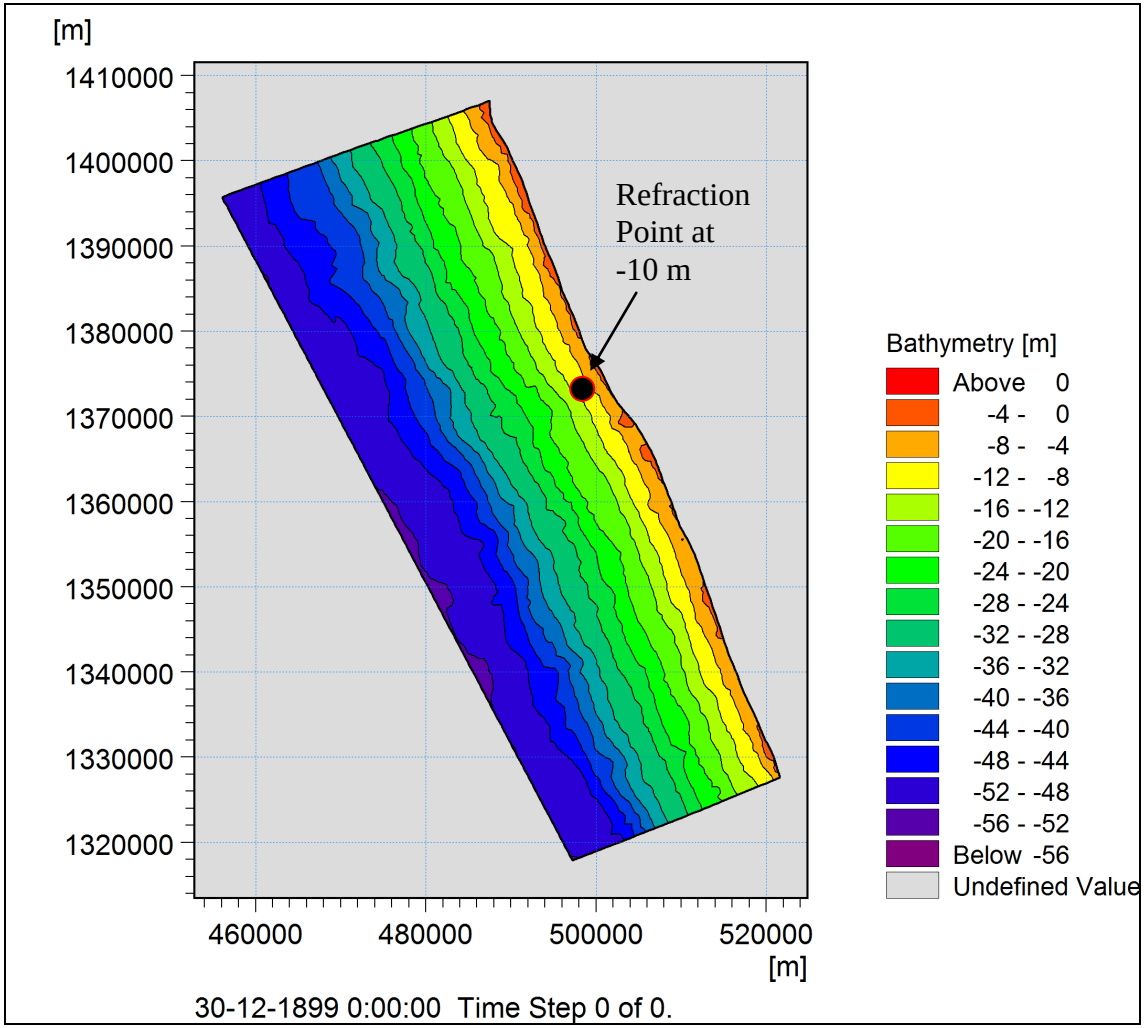


Fig.5 Area for MIKE 21 SW Model Showing Refraction Point at Ajanur

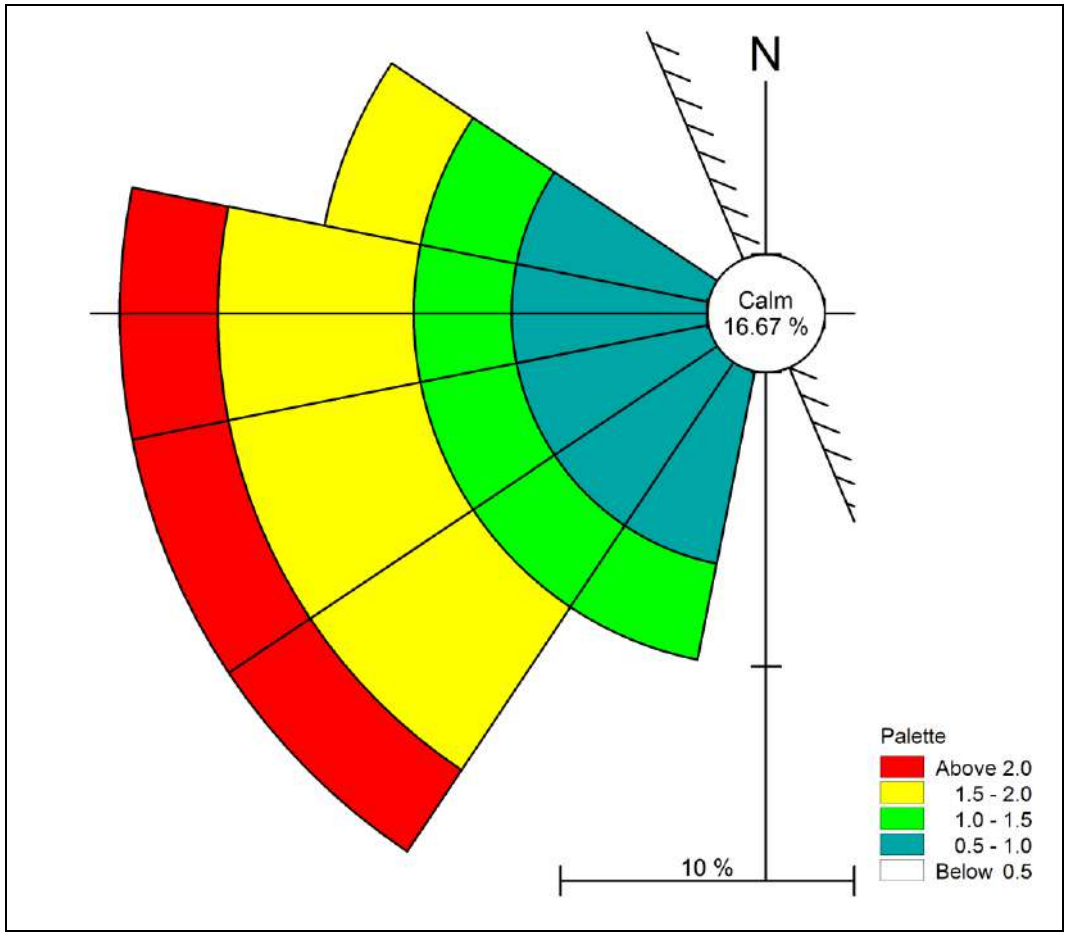


Fig.6(A) Rose Diagram for Wave Heights at Ajanur For SW Monsoon Period (Jun-Sep)

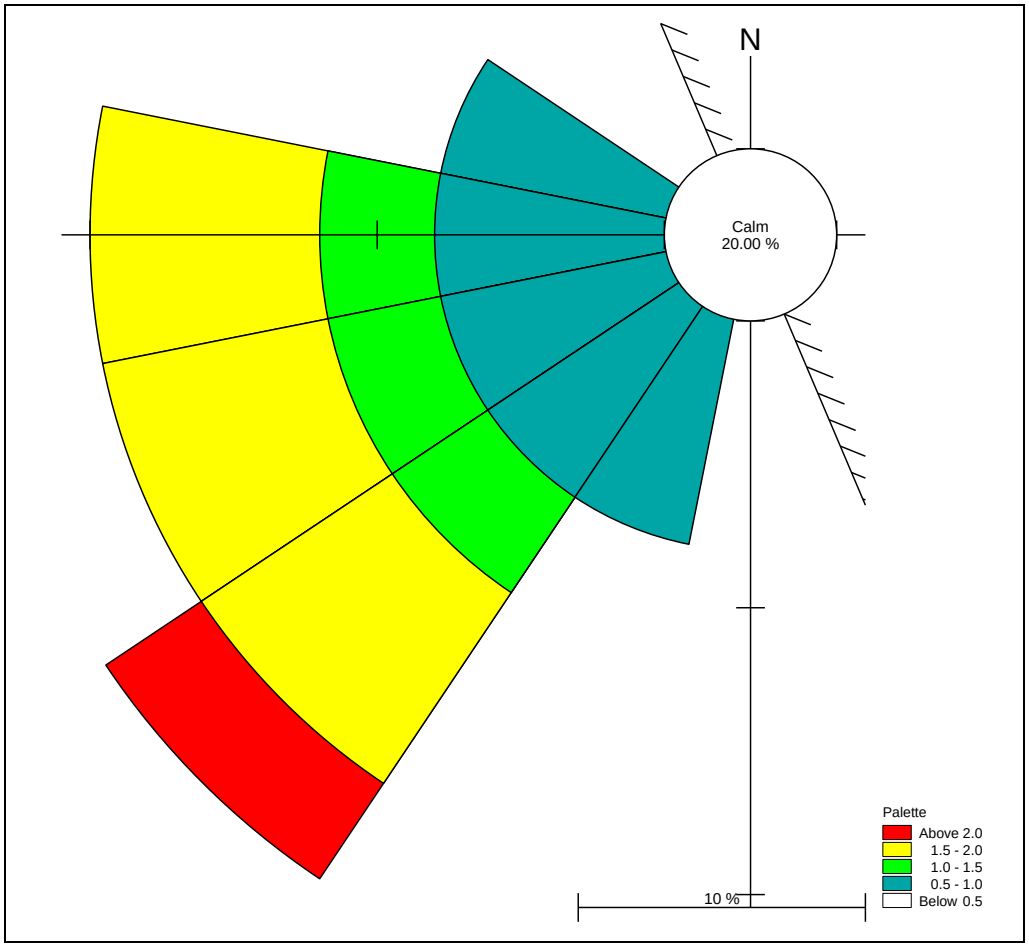


Fig.6(B) Rose Diagram for Wave Heights at Ajanur for NE Monsoon Period (Oct-Jan)

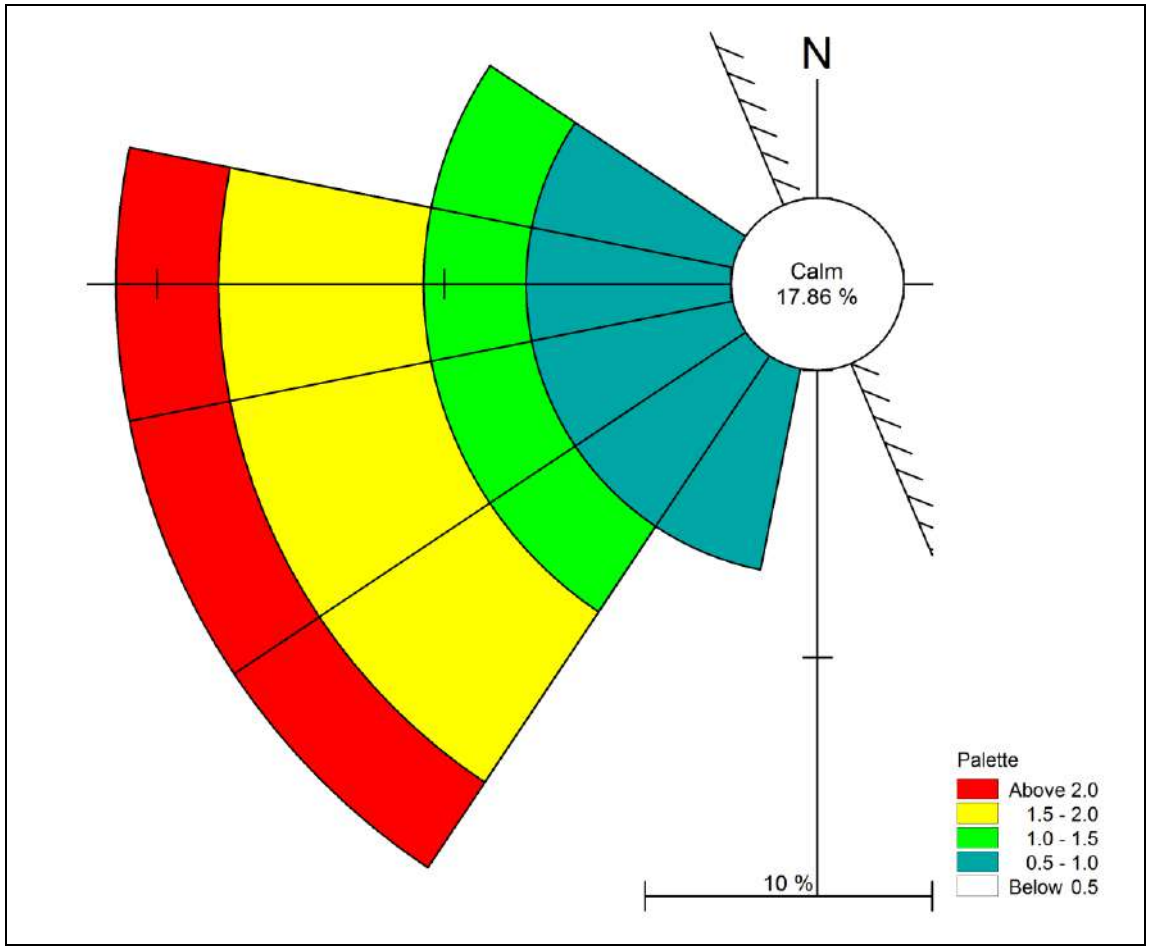


Fig.6(C) Rose Diagram for Wave Heights at Ajanur for Non-Monsoon Period (Feb-May)

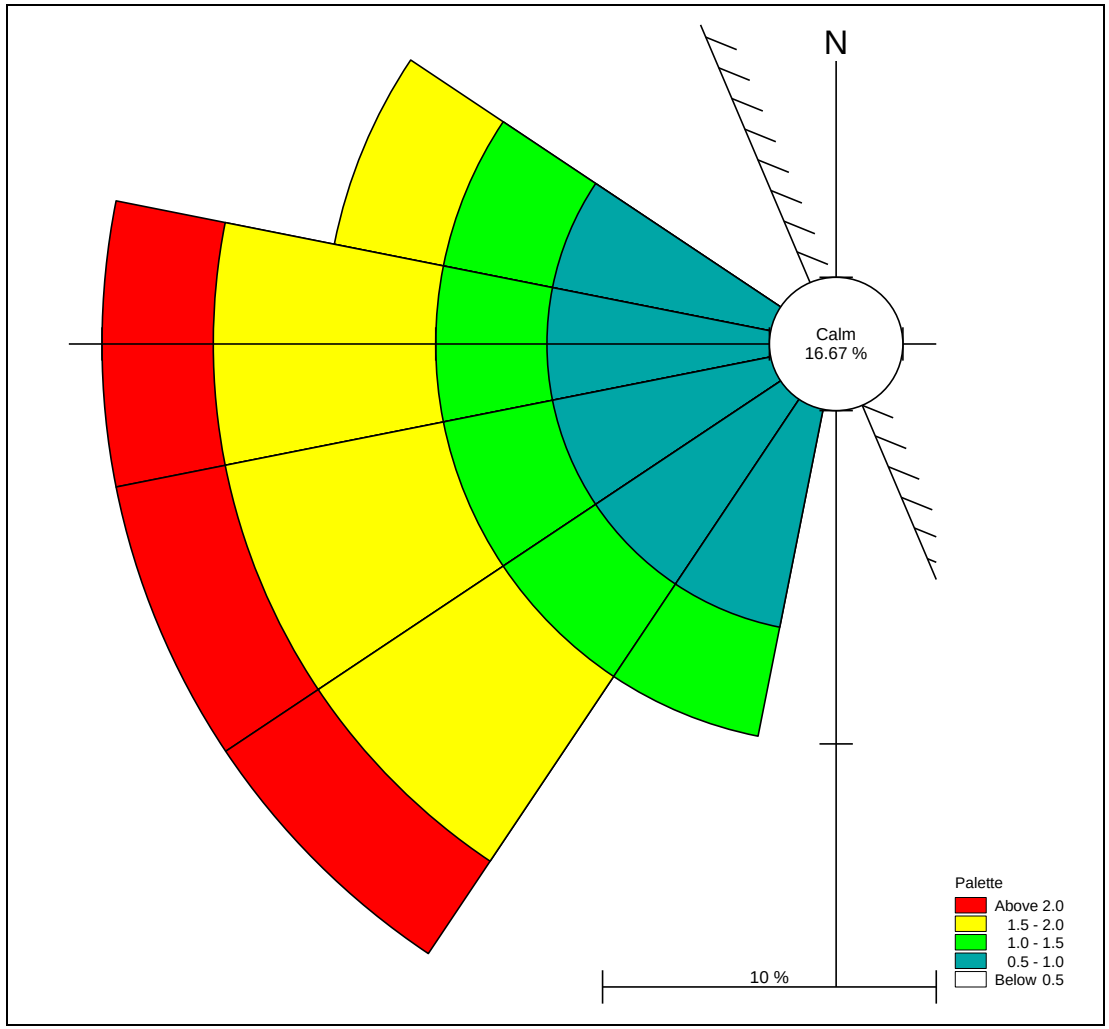


Fig.6(D) Rose Diagram for Wave Heights at Ajanur for Annual Period (Jan-Dec)

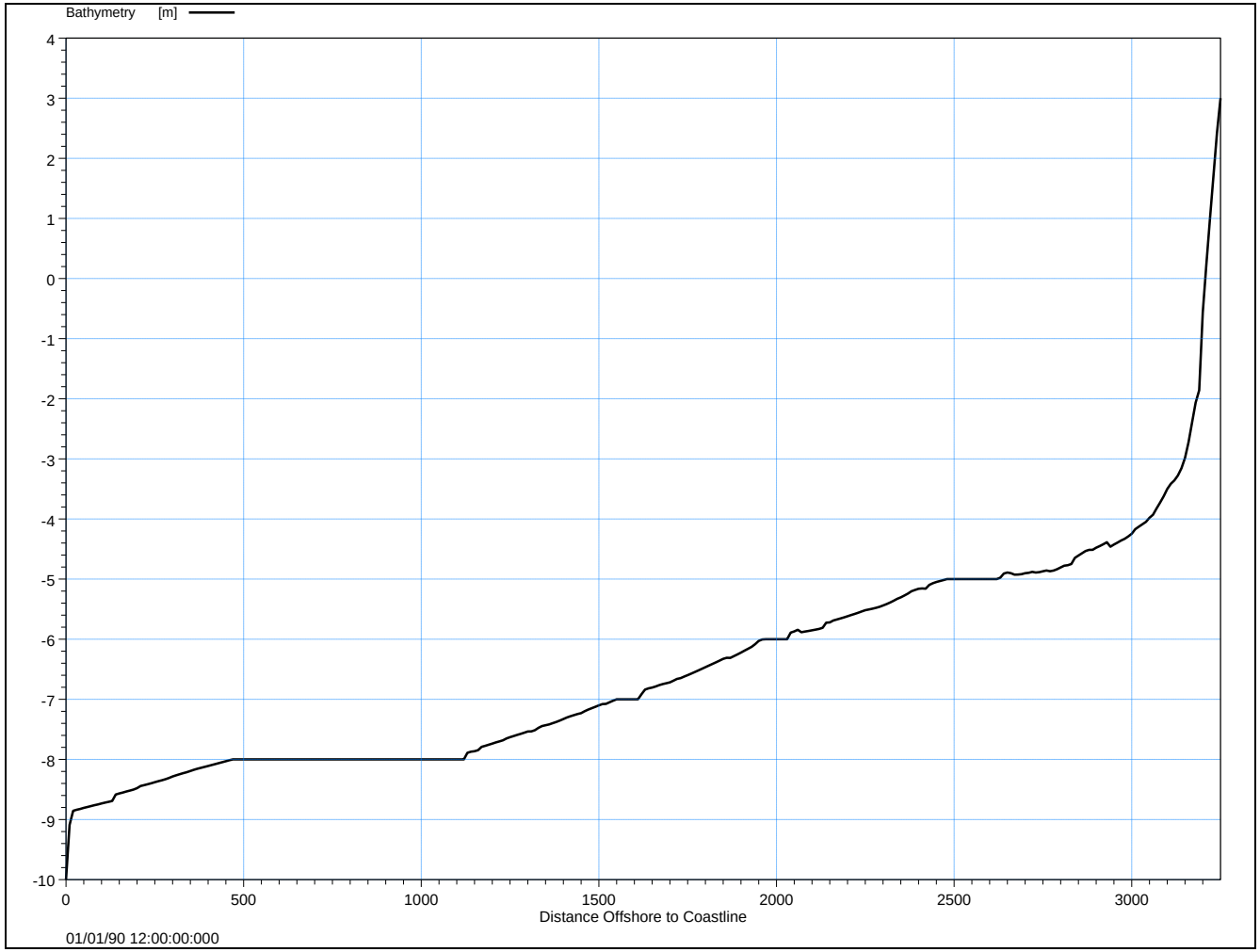


Fig.7 Cross-Shore Bed Profile

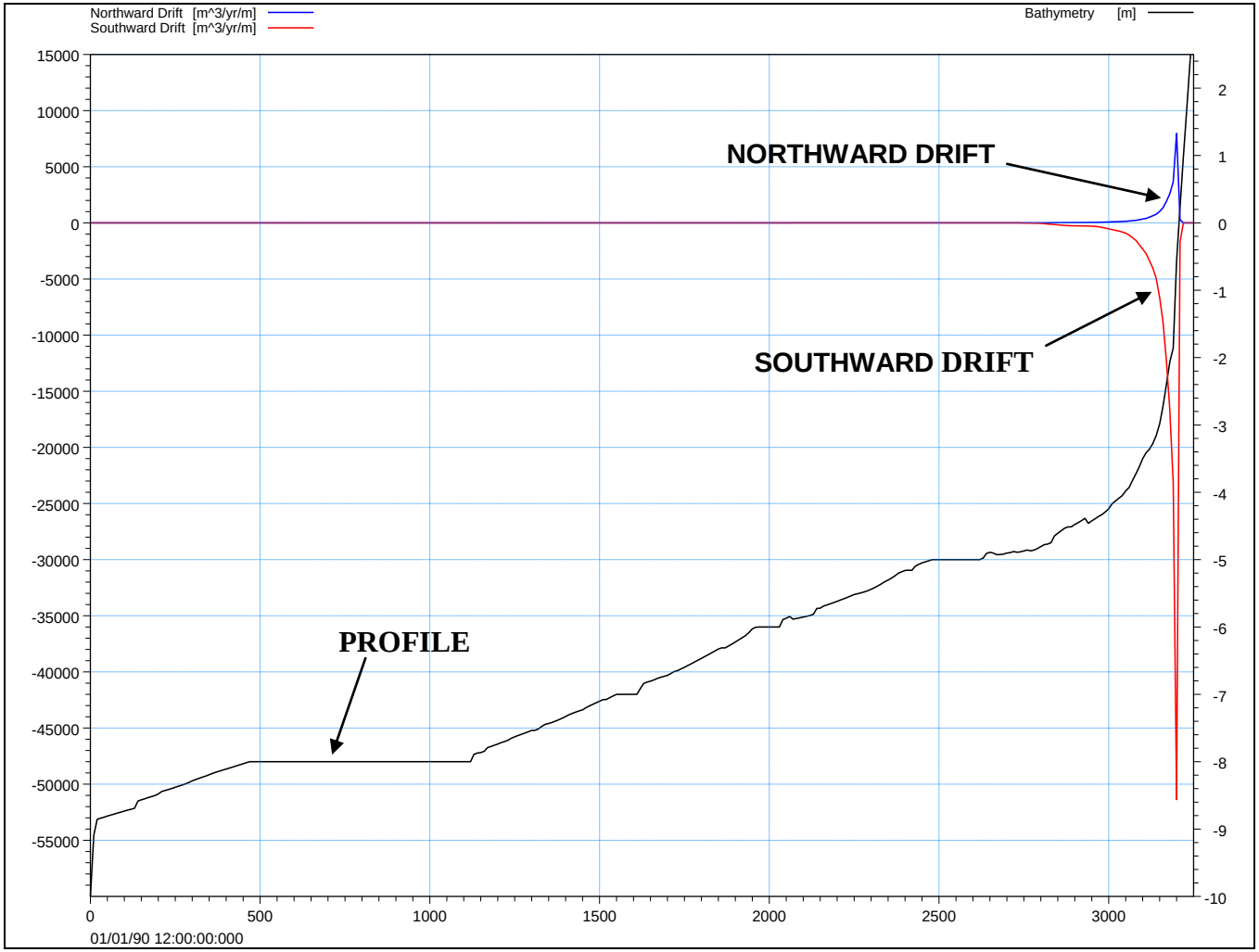


Fig.8(A) Cross-Shore Distribution of Littoral Drift for SW Monsoon Period

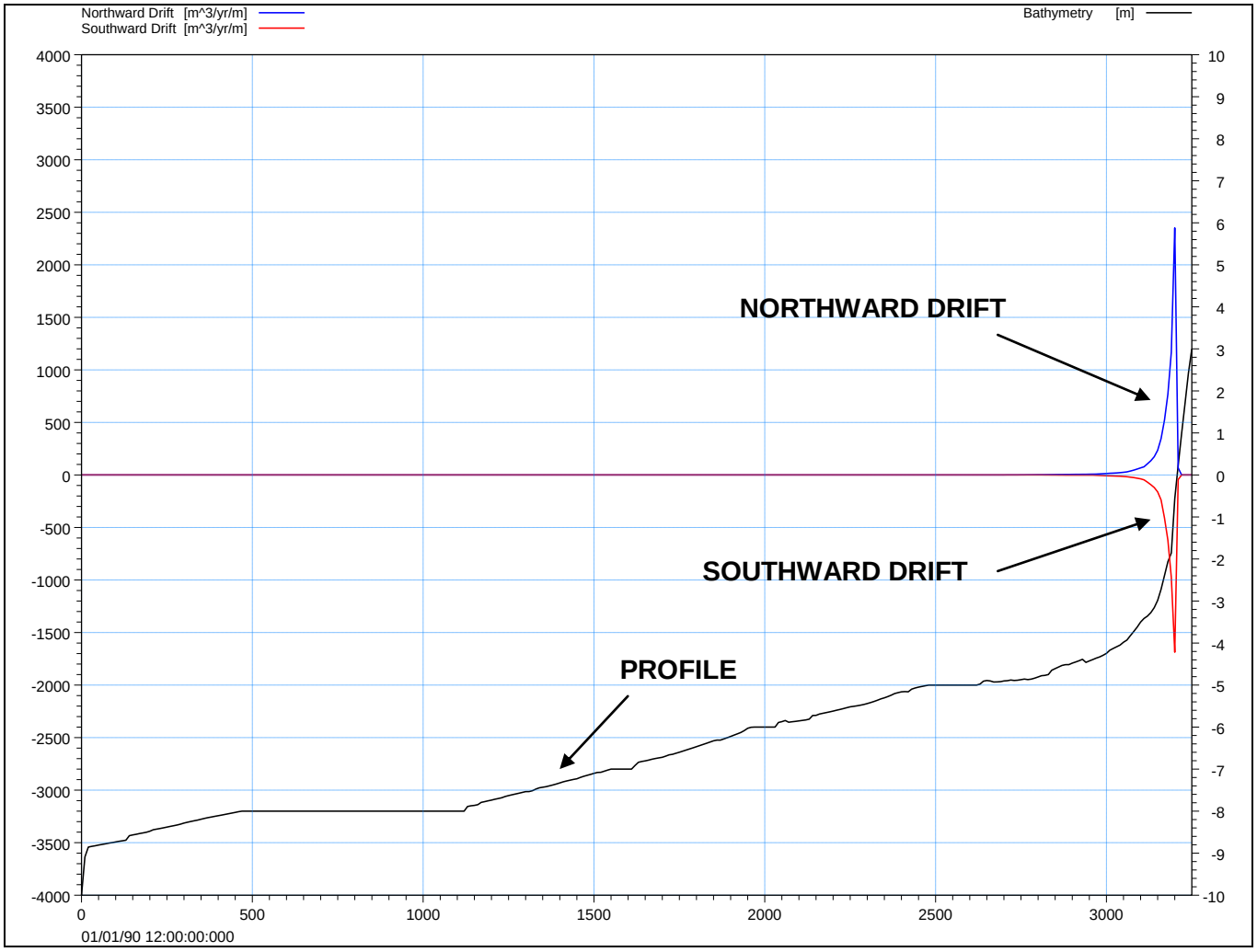


Fig.8(B) Cross-Shore Distribution of Littoral Drift for NE Monsoon Period

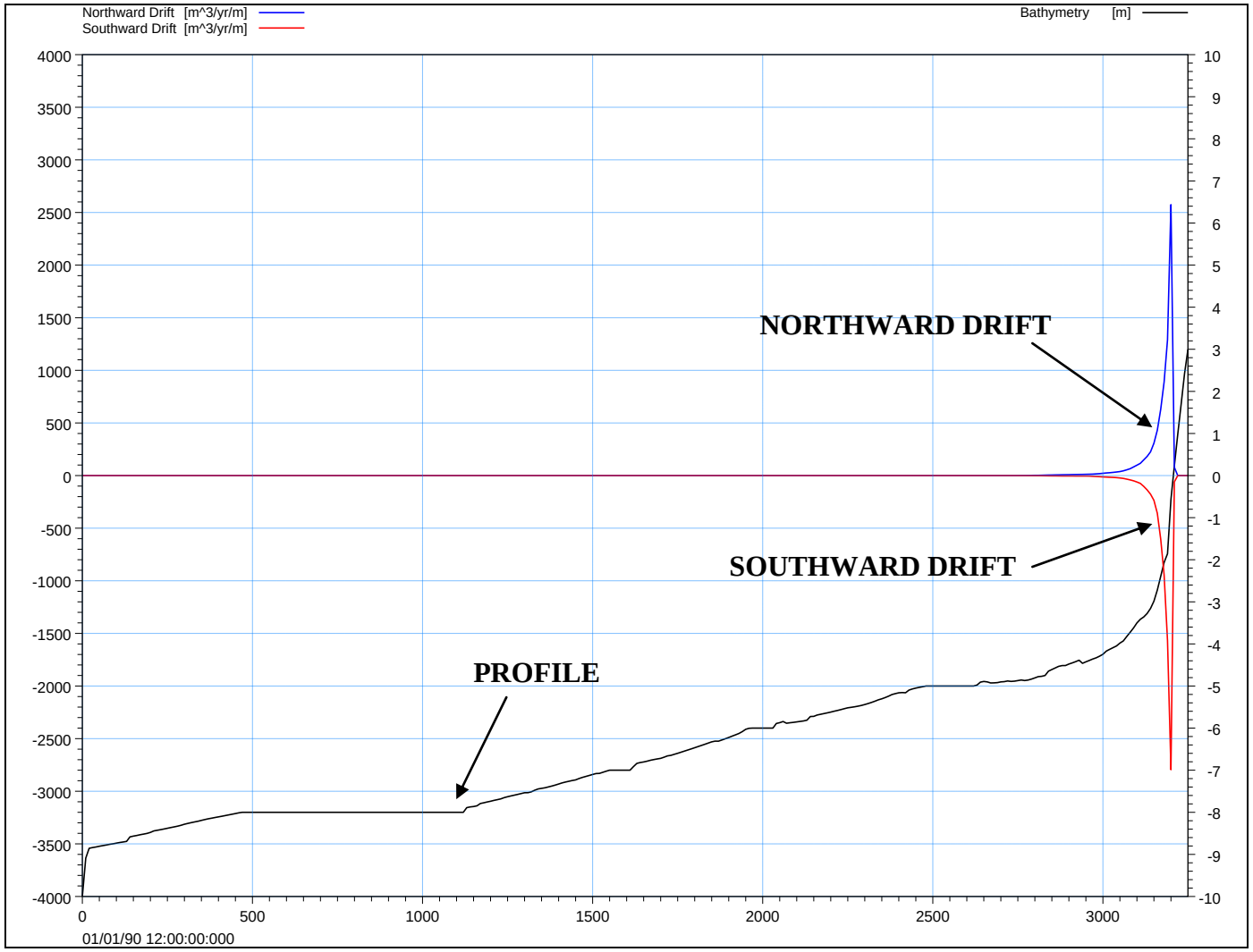


Fig.8(C) Cross-Shore Distribution of Littoral Drift for Non Monsoon Period

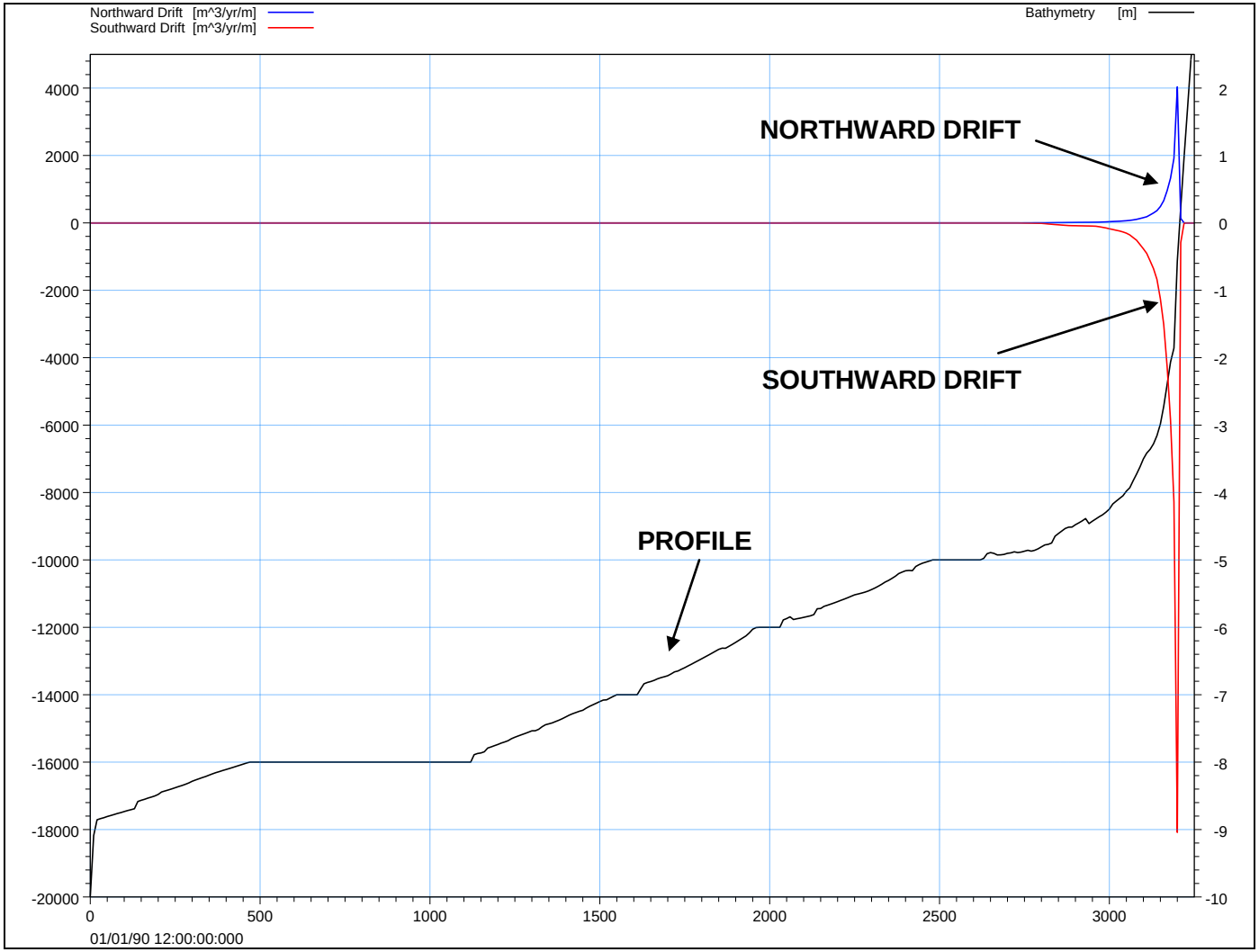


Fig.8(D) Cross-Shore Distribution of Littoral Drift for Annual Period

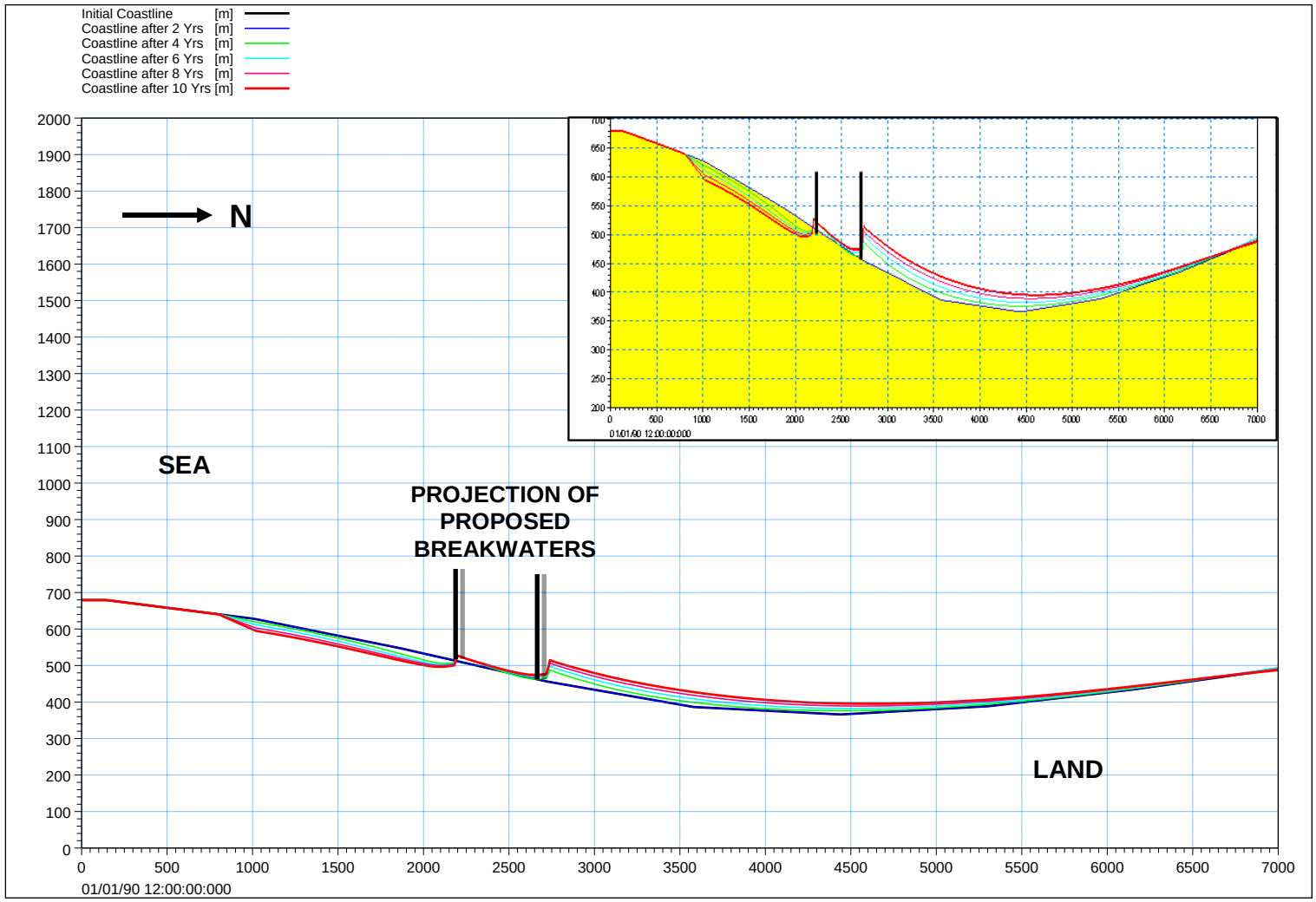


Fig.9 Shoreline Evolution after 2nd, 4th, 6th, 8th and 10th Year

Environmental Impact Assessment Report

for

Proposed Construction of Ajanur Fishing Harbour

at

Ajanur Village, Kasaragod Taluk, Kasaragod District, Kerala State

Fish Landing Capacity: 28,695 Tonnes Per Annum

[Schedule as per EIA Notification: Not applicable

Category: Standalone CRZ Clearance]

by

Harbour Engineering Department

Government of Kerala

Harbour Engineering Kasaragod Division,
Office of the Executive Engineer,
Clock Tower Junction, Near Railway Station, Kasaragod, Kerala – 671121

Prepared by

(Environmental Consultancy and Laboratory)
Unit No. 206, 224, 225 Jai Commercial Complex,
Eastern Express Highway, Opposite Cadbury Factory,
Khopat, Thane (West) – 400 601, Maharashtra
Tel: 022 – 25342776/25360198, 0484 4301947

NABET Certificate No.: NABET/EIA/24-27/RA 0378; valid till 18.10.2027

Document No: UTC/EIA/CRZ/00216/2024/01/02
EIA Execution Period: 12.07.2022 – 19.09.2025

Laboratory Used: Envirodesigns Eco Labs (NABL Certificate No: TC-7714, valid up to 18.10.2025)

Eco Tower, Janatha Jn., Palarivattom,
Kochi, Kerala, India
Phone: + 91 9388609505

General Conditions as per EIA Notification: Not Applicable
Specific Conditions as per EIA Notification: Not Applicable
Period of Baseline Data Collection: 19.12.2022 – 14.03.2023

September 2025

Revision History						
S. No.	**Document Reference No.**	**Issue No.**	**Revision No.**	**Revision Date**	**Brief Description of the Revision**	**Reason for Revision/ Amendment**
1.	UTC/EIA/CRZ/00216/2024	01	00	29.11.2024	-	Draft
2.		01	01	26.08.2025	-	Internal Review
3.		01	02	19.09.2025	Revision in project cost	Review by Project Proponent

Disclaimer:

This Environmental Impact Assessment (EIA) report has been prepared with all reasonable skills, knowledge, care and diligence by NABET accredited EIA Consultant, ULTRA TECH, in accordance with the terms of the contract (Agreement No. 13/2022-23/EE/HED/KGD dated 12/07/2022) with Harbour Engineering Department, Government of Kerala, the project proponent, incorporating General Terms and Conditions of Contract and taking in to account of the resources devoted to it, for the submission to Kerala Coastal Zone Management Authority, for consideration for CRZ clearance. The report was discussed with project proponent, in detail before releasing.

This EIA report has been prepared using information received from project proponent, collecting primary data and compilation of secondary data from available resources. ULTRA TECH is not responsible for the origin and authenticity of the information provided by proponent. Neither this report nor any of its contents can be used for any purpose other than stated above, without the prior written consent from the project proponent.

Undertaking

(As per OM No. :- J.11013/41/2006/IA-II(I) Dated: 05-10-2011 by MoEF&CC, New Delhi, Govt. of India)

Date: 19.09.2025

I, Executive Engineer & Authorized Signatory of Harbour Engineering Division, Kasaragod do hereby confirm that, ULTRA TECH (NABET Accreditation no: NABET/EIA/24-27/RA 0378 valid till 18.10.2027) has prepared the EIA report for the 'Proposed Construction of Ajanur Fishing Harbour' at Ajanur Village, Kasaragod Taluk, Kasaragod District, Kerala State

I hereby undertake the ownership of the EIA report and confirm that I will be accountable for all the project related information mentioned in the report.

Executive Engineer & Authorized Signatory
Harbour Engineering Division, Kasaragod
Office of the Executive Engineer,
Clock Tower Junction, Near Railway Station,
Kasaragod, Kerala – 671121

Annexure VII as per scheme of accreditation by QCI-NABET

Part A: Declaration by ACO Experts Contributing to the EIA

I, hereby, certify that I was a part of the EIA team in the following capacity that developed the above EIA.

EIA coordinator (EC):

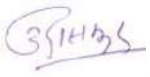
Name: Dr. Vikrant Kulkarni

Signature and Date: 

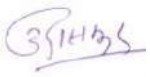
Period of involvement: July 2022 to September 2025

Contact information: vikrant@ultratech.in

Functional area experts:

S. No.	Functional areas	Name of the expert/s	Involvement (period and task)	Signature and date
1.	Air pollution monitoring, prevention and control (A)	Ms. Ananthitha A	***Involvement Period:*** Four Months ***Task:*** Air pollution monitoring, identification of impacts and mitigation measures, contribution to EIA documentation	
2.	Water pollution monitoring, prevention and control (WP)	Ms. Ananthitha A	***Involvement Period:*** Three Months ***Task:*** Water & waste water monitoring, water balance, identification of impacts and mitigation measures, contribution to EIA documentation	
3.	Solid and hazardous waste management (SHW)/ Solid waste management (SW)	Mr. Kailash Nath Sharma	***Involvement Period:*** One Month ***Task:*** Identification of hazardous and non-hazardous waste, contribution to EIA documentation	
4.	Socio- economics (SE)	Mr. Yogesh Raskar	***Involvement Period:*** Two Months	

S. No.	Functional areas	Name of the expert/s	Involvement (period and task)	Signature and date
			Task: Conducting baseline socio-economic surveys, conducting social need assessment, evaluation of socio-economic status, contribution to EIA documentation	
5.	Ecology & biodiversity (EB)	Dr. Vikrant Kulkarni	***Involvement Period:*** Two Months ***Task:*** Preparation of status report of rare, endangered and threatened species of flora & fauna, impact assessment, contribution to EIA documentation	
6.	Hydrology, ground water & water conservation (HG)	Mr. S. I. Tanweer	***Involvement Period:*** One Month ***Task:*** Analysis of surface hydrological data, contribution to EIA documentation	
7.	Geology (GEO)	Not involved[#]	-	-
8.	Soil conservation (SC)	Ms. Padmini Shinde-Barde	***Involvement Period:*** Three Months ***Task:*** Sampling, analysis and characterization of soil, assessment of impacts, remediation for soil pollution, contribution to EIA documentation	
9.	Meteorology, air quality modelling & prediction (AQ)	Not involved[#]	-	-
10.	Noise & vibration (NV)	Mr. Arun Kumar	***Involvement Period:*** Three Months ***Task:*** Monitoring of noise/vibration, identification of impacts and mitigation measures,	

S. No.	Functional areas	Name of the expert/s	Involvement (period and task)	Signature and date
			contribution to EIA documentation	
11.	Land Use (LU)	Mr. Yogesh Raskar	***Involvement Period:*** One Month ***Task:*** Generation of data for land use pattern, developing land use map, integration of land use data and impact assessment, contribution to EIA documentation	
12.	Risk assessment & hazards management (RH)	Mr. Kailash Nath Sharma	***Involvement Period:*** One Month ***Task:*** Identification of hazard and hazardous substances, preparation of on-site Emergency Preparedness Plan, preparation of impact diagrams, contribution to EIA documentation	

#as per the rationalization of the scheme of accreditation of NABET

Part B: Declaration by Head of the ACO / authorized person

I, Niranjan Shekhar Tamhane, hereby, confirm that the above-mentioned experts prepared the EIA report for the project 'Proposed Construction of Ajanur Fishing Harbour' at Ajanur Village, Kasaragod Taluk, Kasaragod District, Kerala State and EIA Coordinator (EC) is fully aware of the content. The consultant organization shall be fully accountable for any mis-leading information. It is also certified that EIA Report has been analysed by the system for plagiarism check using Plagiarism Checker X software in accordance with good scientific practice. No unethical practices have been carried out and external data / text has not been used without proper acknowledgement, while preparing this EIA report.

Certificate of Plagiarism check	
Title of EIA Report:	Environmental Impact Assessment Report for Proposed Construction of Ajanur Fishing Harbour at Ajanur Village, Kasaragod Taluk, Kasaragod District, Kerala State
Name of Accredited Organisation:	ULTRA TECH
Unique Identification Number:	UTC/EIA/CRZ/00216/2024
Name of EIA Co-ordinator:	Dr. Vikrant Kulkarni
Name of the Software:	Plagiarism Checker X
Date of Check:	19.09.2025
Time of Check:	09.25 AM

Date and Sign of EIA Co-ordinator:



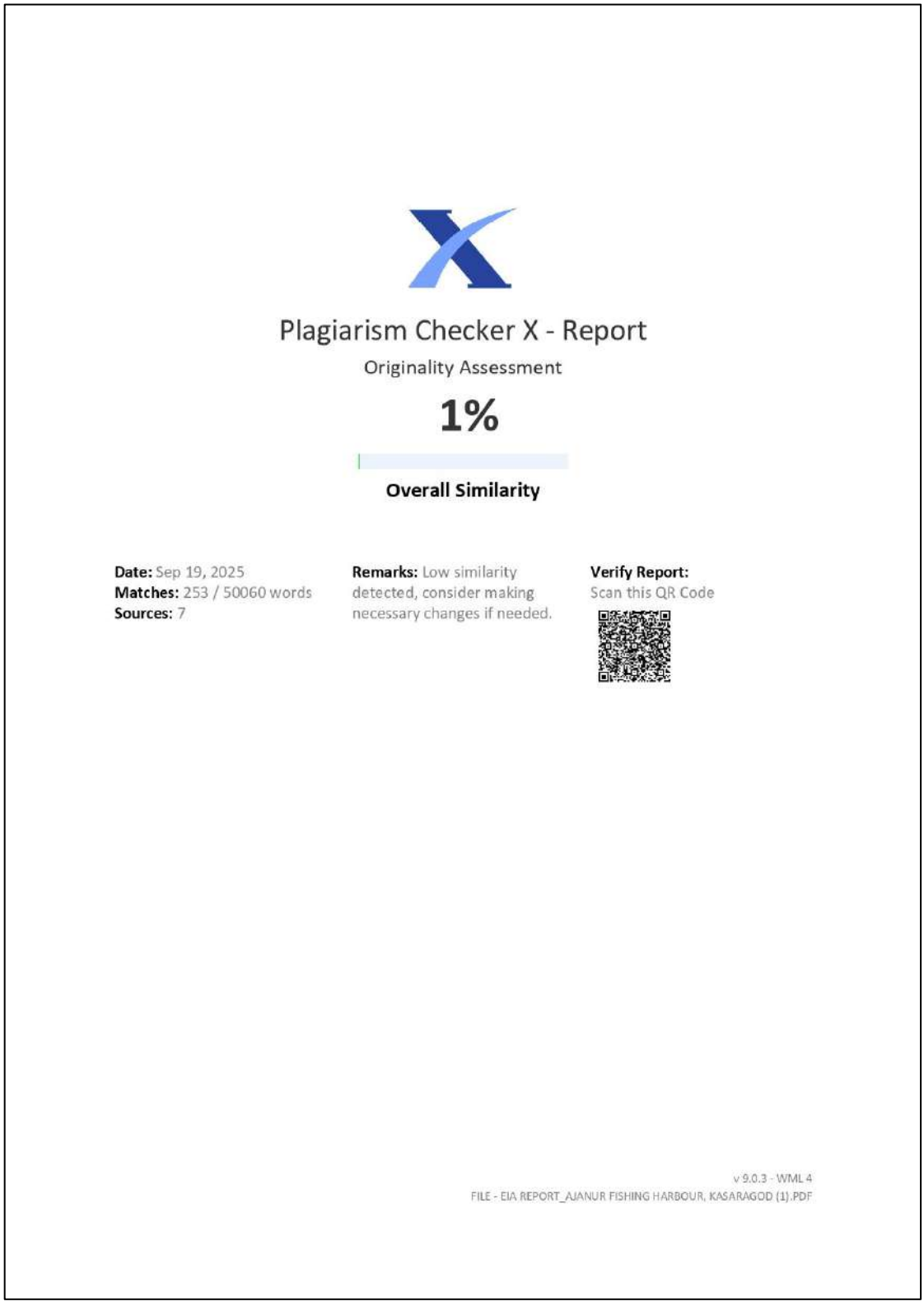
Name: Dr. Vikrant Kulkarni
Designation: EIA Co-ordinator Signature

Date and Sign of Head of ACO / authorised person:



Name: Niranjan Shekhar Tamhane
Designation: Proprietor & Managing Director
Name of the EIA consultant organization: ULTRA TECH
NABET Certificate No. & Issue Date: NABET/EIA/24-27/RA 0378; valid till 18.10.2027

Certificate of Plagiarism Check



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List of Annexures

S. No.	Name of Annexure
Annexure - 1	Environmental Baseline Monitoring Reports
Annexure - 2	NABET Accreditation Certificate of EIA Consultant
Annexure - 3	NABL Certificate of the Laboratory

List of Abbreviations

Abbreviations		Description
ACO	:	Accredited Consultant Organization
AEE	:	Assistant Executive Engineer
AMSL	:	Above Mean Sea Level
AQI	:	Air Quality Index
BDL	:	Below Detection Limit
BMTPC	:	Building Materials and Technology Promotion Council
BOD	:	Biochemical Oxygen Demand
CER	:	Corporate Environmental Responsibility
CGWA	:	Central Groundwater Authority
COD	:	Chemical Oxidation Demand
CPCB	:	Central Pollution Control Board
CRZ	:	Coastal Regulation Zone
CTE	:	Consent to Establish
CTO	:	Consent to Operate
CWPRS	:	Central Water & Power Research Station
CZMP	:	Coastal Zone Management Plan
DDMA	:	District Disaster Management Authority
DDMP	:	District Disaster Management Plan
DEM	:	Digital Elevation Model
DG	:	Diesel Generator
DMP	:	Disaster Management Plan
DPR	:	Detailed Project Report
DO	:	Dissolved Oxygen
EIA	:	Environmental Impact Assessment
EMC	:	Environment Management Cell
EMP	:	Environment Management Plan
ERDMP	:	Emergency Response and Disaster Management Plan
ETP	:	Effluent Treatment Plant
FCC	:	False Colour Composite
FLC	:	Fish landing Centre
GHG	:	Greenhouse Gases
GIS	:	Geographic Information System
HED	:	Harbour Engineering Department
HSE	:	Health Safety and Environment
HTL	:	High Tide Line
INR	:	Indian Rupee
IS	:	Indian Standard
IUCN	:	International Union for Conservation of Nature
KCZMA	:	Kerala Coastal Zone Management Authority

Abbreviations		Description
KCZMP	:	Kerala Coastal Zone Management Plan
KSDMA	:	Kerala State Disaster Management Authority
KSDMP	:	Kerala State Disaster Management Plan
KSEB	:	Kerala State Electricity Board
KSPCB	:	Kerala State Pollution Control Board
KWA	:	Kerala Water Authority
LTL	:	Low Tide Line
LULC	:	Land Use – Land Cover
MBBR	:	Moving Bed Biofilm Reactor
MDL	:	Minimum Detection Limit
MoEF&CC	:	Ministry of Environment Forest and Climate Change
MPN	:	Most Probable Number
NAAQS	:	National Ambient Air Quality Standards
NABET	:	National Accreditation Board for Education and Training
NABL	:	National Accreditation Board for Testing and Calibration Laboratories
NASA POWER	:	National Aeronautics and Space Administration – Prediction of Worldwide Energy Resources
NCESS	:	National Centre for Earth Science Studies
NH	:	National Highway
NOC	:	No-Objection Certificate
NTU	:	Nephelometric Turbidity Unit
PCC	:	Plain Cement Concrete
PMMSY	:	Pradhan Mantri Matsya Sampada Yojana
PPE	:	Personal Protective Equipment
PUC	:	Pollution Under Control
RCC	:	Reinforced Cement Concrete
RWH	:	Rain Water Harvesting
SC	:	Scheduled Caste
SDMP	:	State Disaster Management Plan
SEIAA	:	State Environmental Impact Assessment Authority
SH	:	State Highway
SOP	:	Standard Operating Procedures
ST	:	Scheduled Tribe
STP	:	Sewage Treatment plants
ToR	:	Terms of Reference
WPA	:	Wildlife Protection Act

Executive Summary

1. Project Name and Location

The proposed project is the construction of a fishing harbour at Ajanur Village, Kasaragod Taluk, Kasaragod District, Kerala State, next to the mouth of Chithari River, with a fish landing capacity of 28,695 Tonnes Per Annum (TPA). Presently, there is a fish landing centre at the proposed project site which has a dilapidated auction hall, net mending shed and a toilet block. Apart from this, the mouth of the river is migratory in nature, and its shifts are so drastic that it even damaged the existing fish landing centre facilities. Low discharge in the river during the summer season causes sand bar formation and closure at the mouth which leads to flash floods at the densely populated upstream coastal area during the onset of monsoon.

Inadequate facilities at the fish landing centre, migratory nature of the river mouth and sand bar formations poses life threatening risks to the fishers navigating the mouth to earn their daily income for the fishers and limits utilising the Ajanur coast to its full potential. Over 500 fishing vessels experience significant challenges in navigating the area. As a permanent solution to these pestering issues, Harbour Engineering Department (HED) proposed to construct an open sea fishing harbour at Ajanur along with river training structures to stabilise the river mouth.

Ajanur Fishing Harbour will consist of a northern and southern breakwater, south of the river mouth and adequate landside facilities such as wharf, auction hall, berthing wharf, etc. to aid fish landing and handling, along with necessary facilities for the fishers such as rest shed, canteen, gear shed, toilet block, etc. To ensure security at the harbour, locker room, office room cum harbour surveillance camera room, gate and gate house, etc. will be provided. The landside facilities will also be provided with Effluent Treatment Plant (ETP), Rain Water Harvesting (RWH) tanks and solar panels as power source for the entire harbour facilities for the efficient environmentally friendly management of the harbour.

On the north of the river mouth, a river training breakwater is proposed. The northern breakwater of the harbour will act as the southern river training breakwater. The proposed project will increase number of fishing days to more than 300 days and attracting more fishing vessels into the harbour. The project is in accordance with the directions of Ministry of Fisheries, Animal Husbandry and Dairying, as per the guidelines of Pradhan Mantri Matsya Sampada Yojana (PMMSY).

The basic details of the project and the project proponent are given in Table 1.

Table 1: Basic details of Project & Proponent

Particulars	Descriptions
Name of Project	Proposed Construction of Ajanur Fishing Harbour at Ajanur Village, Kasaragod Taluk, Kasaragod District, Kerala State
Project location	Northern breakwater: 12°20'11.66"N, 75° 3'53.04"E Southern breakwater: 12°19'55.64"N, 75° 3'58.95"E River training works: 12°20'17.39"N, 75° 3'51.34"E Fishing Harbor facilities: 12°20'10.18"N, 75° 3'54.87"E
Project Proponent	Harbour Engineering Department, Government of Kerala

Particulars	Descriptions
Authorized signatory of the Project Proponent	Executive Engineer Harbour Engineering Division, Kasaragod

The project site falls under Coastal Regulation Zone (CRZ) IA, CRZ IB, CRZ II, CRZ IVA and CRZ IVB, based on CRZ map prepared by National Centre for Earth Science Studies (NCESS), Thiruvananthapuram in May 2025 and therefore requires CRZ clearance from Kerala Coastal Zone Management Authority (KCZMA) in accordance with CRZ Notification 2019. ULTRA TECH has carried out the Environmental Impact Assessment (EIA) studies and preparation of Environmental Management Plan (EMP) for obtaining CRZ clearance.

2. Product and Capacity

The salient features of the project are given in Table 2.

Table 2: Salient Feature of the Project

<table>
<tr><th>Particulars</th><th>Description</th></tr>
<tr><td>Total fish landing capacity</td><td>28,695 TPA</td></tr>
<tr><td>Details of fishing vessels</td><td>
<table>
<tr><th>Overall Vessel Length (m)</th><th>No. of Vessels</th><th>Fishing Trip (Days)</th><th>Fishing Trips per Year</th><th>Average Daily Landing (kg)</th><th>Fish Landing Capacity/Year (kg)</th></tr>
<tr><td>8</td><td>30</td><td>1</td><td>220</td><td>50</td><td>3,30,000</td></tr>
<tr><td>10</td><td>50</td><td>1</td><td>150</td><td>700</td><td>52,50,000</td></tr>
<tr><td>15</td><td>553</td><td>1</td><td>44</td><td>950</td><td>2,31,15,400</td></tr>
<tr><td colspan="5">Total</td><td>2,86,95,400</td></tr>
</table>
</td></tr>
<tr><td>Proposed activities</td><td>

Construction of harbour basin with two breakwaters, north breakwater of 1,150 m length and south breakwater of 425 m length.
River training structure in the form of a breakwater of length 435 m on the north of the mouth of Chithari River
Landside facilities for the harbour which includes wharf of dimension 120 m × 6.6 m and auction hall of dimension 60 m × 15 m, berthing wharf, canteen, rest shed, locker room, gear shed, toilet block, workshop building, office room cum harbour surveillance camera room, gate and gate house with ATM and toll booth, ETP, RWH, development of green area, approach road, internal road, parking area, drainage facility, compound wall and side protection work, etc.
Dredging proposed in between the north breakwater and river training work at the mouth of river Chithari
Dredging and construction of reclamation bund

</td></tr>
</table>

Particulars	Description
	• The harbour will be developed with smart infrastructures like digital platforms for information dissemination, electronic auctions for broader market access, automated systems for sorting, grading, and cataloguing catches, Hazard Analysis Critical Control Points (HACCP) integration, and surveillance systems.
Period of construction	46 Months
Beneficiary population	• Local population in 3 fishing villages; Hosdurg, Ajanur and Pallikkara. • Beneficial for 7,094 people with 2,138 registered fishermen

3. Resource Requirement

The resource requirement of the project is depicted in Table 3.

Table 3: Resource Requirement for the Project

<table>
<tr><th>S. No.</th><th>Particulars</th><th>Construction Phase</th><th>Operation Phase</th></tr>
<tr><td>1.</td><td>Water requirement</td><td>
<table>
<tr><th><u>Details</u></th><th><u>:</u></th><th><u>Quantity</u></th></tr>
<tr><td>Construction Activities</td><td>:</td><td>2 kLD</td></tr>
<tr><td colspan="3">Construction Workers</td></tr>
<tr><td>Domestic Purposes</td><td>:</td><td>2.5 kLD</td></tr>
<tr><td>Flushing</td><td>:</td><td>2 kLD</td></tr>
<tr><td>Total</td><td></td><td>6.5 kLD</td></tr>
</table>
Source: Purchase in tankers</td><td>
<table>
<tr><th><u>Details</u></th><th><u>:</u></th><th><u>Quantity</u></th></tr>
<tr><td>Domestic Purposes</td><td>:</td><td>4 kLD</td></tr>
<tr><td>Flushing</td><td>:</td><td>6 kLD</td></tr>
<tr><td>Fish handling area washing</td><td>:</td><td>6 kLD</td></tr>
<tr><td>Total</td><td></td><td>16 kLD</td></tr>
</table>
Source: Kerala Water Authority (KWA)</td></tr>
<tr><td>2.</td><td>Power requirement</td><td>Temporary connection from Kerala State Electricity Board Limited (KSEB) will be used.</td><td>Harbour will be fully solar powered using solar panels of total capacity of 30 kW.</td></tr>
<tr><td>3.</td><td>Workforce requirement</td><td>Direct employment for about 100 workers/ day</td><td>15 operational staff for the landside facilities</td></tr>
<tr><td>4.</td><td>Transport Infrastructure</td><td>The access to the site is from a public road having about 5 m width. Crescent Road and Palayi - Kanhangad Road links the access road with SH 57.</td><td>• 2-way 2 lane internal road of 4 m width will be developed
• Parking area of 4,320 m^2</td></tr>
</table>

4. Brief Description of Process

The final layout of the fishing harbour and river training walls were decided based on the Modelling study by Central Water & Power Research Station (CWPRS), Pune. Breakwaters of the harbour and for river training works will be constructed with blasted rock from approved quarry varying from sizes 5 kg to 3T and tetrapod of 2T, 6T and 8T.

Reinforced Cement Concrete (RCC) structures with strong foundation and other building components such as concrete beams, slabs, columns, etc, will be made with optimized design considering environmental conditions at the project area.

5. Project Cost and Schedule

Estimated capital cost of the proposed constructions is INR 20,000 Lakhs. It will be funded under Pradhan Mantri Matsya Sampada Yojana (PMMSY) scheme by the Central Government and State Government in the ratio 60:40. The project will commence after receiving CRZ clearance from KCZMA, Kerala.

6. Selection of Project Site

The final location and layout for the fishing harbour was decided after considering various location and alignment options and conducting mathematical modelling studies on tidal currents, wave tranquillity study, sedimentation pattern, littoral drift, and shoreline evolution by CWPRS.

7. Details of Environmental Baseline

- The study area for conducting EIA studies includes a 10.0 km area around the project site. The core zone includes the project site and a radius of 2.0 km from the project site. The buffer zone includes the area outside the core zone and extends up to 10.0 km radius from the project site.
- Baseline monitoring was done for environment and social parameters during the study period from 19.12.2022 to 14.03.2023 through reconnaissance survey followed by field visits, collection of samples, stakeholder consultations & door-to-door household surveys.
- Lakshadweep sea and Chithari River are part of the project site.
- No reservoirs/dams, tiger reserve, elephant reserve, biospheres, national parks, wildlife sanctuaries, community reserves, conservation reserves, reserve/protected forest, unique or threatened ecosystem, critically polluted environmental area, coastal areas rich in corals, mangroves, breeding grounds of specific species and estuaries rich in mangroves, breeding ground of specific species within 10 km study area.
- As per the notified groundwater zone by Central Ground Water Authority (CO), Assessment Unti - Kanhangad, where the project site is located, falls under safe area.
- New Life Maternity Hospital, Athinhal is located 1.39 km, NE from Northern Breakwater. Crescent School, New Building, Kothikkal, and G.F.U.P.S Ajanur Kadappuram School are the nearest educational institutions. Muhiyudheen Juma Masjid Kothikkal, Muttumthala Juma Masjid, Muttumthala and Sidiqual Bilal Masjid, Ettammal are the nearest religious structures located within 2 km of the project site.
- The results of environmental baseline monitoring of ambient air, noise level, surface water, soil, marine water and marine sediment are given in Table 4.

Table 4: Summary of Environmental Baseline Monitoring

S. No.	Parameter	No. of Locations	Inference
1.	Ambient Air Quality	3	All tested parameters, PM_{10}, $PM_{2.5}$, SO_2, NO_2 and CO are found within prescribed limits of National Ambient Air Quality Standards (NAAQS) - 2009
2.	Ambient Noise level	3	Noise Levels are within the permissible limits as per Noise Pollution (Regulation & Control) Rules, 2000
3.	Surface water	1	The water exhibits low color intensity, agreeable odor, and turbidity indicating minimal organic pollution. However, its high hardness, chlorides, dissolved solid, and sulphates render it salty and unsuitable for drinking. The presence of phytoplankton and zooplankton indicates a healthy aquatic ecosystem.
4.	Soil	1	The soil sample was sparsely acidic with low organic content and high electrical conductivity indicates a high level of salinity. It was observed that fertility of soil sample is poor in terms of organic matter.
5.	Marine Water	2	Marine water samples collected demonstrated good quality typical for marine sea water, featuring optimal pH, low coliform bacteria, and adequate dissolved oxygen for marine life. Minimal organic pollution, low nutrient levels, and negligible industrial contaminants indicate a healthy marine environment with no significant eutrophication or pollution concerns.
6.	Marine Sediment	2	Sediment sample quality is generally good at sampling locations. Presence of benthic organisms indicating overall health of the marine ecosystem.

- Through satellite image analysis for land use land cover study using Q-GIS software for 2 km and 10 km study area, it was observed that the area is dominated by water bodies.
- The project site falls in Zone III (moderate seismic intensity) as per Seismic Map of India (IS: 1893, Part I, 2002).
- Study area experiences a tropical and unique climate with an oppressive summer and plentiful seasonal rainfall. As per the Agro-climatological data for the year 2022 collected from NASA POWER for the project location. Maximum temperature experienced was during March (35.1°C) and minimum during the month of January (21.14°C). Maximum precipitation is experienced in the month of July, whereas the study area received negligible rainfall during the month of November. Relative humidity is generally high ranging between 66.75% and 90.94%. The highest wind speed was found to occur during the months of July.
- Wind zone is Moderate Damage Risk Zone – B (Vb = 39 m/s) as per the Wind & Cyclone Hazard Map published by the Building Material & Technology Promotion Council (BMPTC), Ministry of Housing & Urban Affairs (MoH), Government of India (GoI). The predominant wind direct is from west to east direction.

- No threatened, endangered & endemic species and migratory fauna were observed in the study area as per International Union for Conservation of Nature (IUCN) Red List of Threatened Species. *Ptyas mucosa* (Rat Snake), *Haliastur indus* (Brahminy Kite), Schedule I species as per Wildlife (Protection) Amendment Act, 2022 were found in the study area.
- Socio-economic survey for the project was carried out through stakeholder consultation and door-to-door surveys with structured questionnaires. Survey revealed the following;
  - The fishers find it extremely difficult to navigate the mouth due to its migratory nature and closure of mouth. The sandbar formations at the mouth demands manual dredging and opening of the mouth to re-facilitate movement of vessels.
  - The region faces recurring threats of flooding and sea encroachment.
  - Saltwater intrusion is an issue and therefore the coastal residents depend exclusively on pipeline water to meet their daily water requirement.
  - Local elected representatives suggest constructing sea walls to address coastal erosion.

8. Identification of Hazardous Material

No hazardous material is being handled or envisaged to be handled at the fishing harbour. Fuel used for machineries and waste oil shall be securely stored in designated locations and shall be timely handed over to the authorized dealers.

9. Anticipated Impacts and Mitigation Measures

During construction phase, activities such as transportation and handling of materials, increased vehicular movement, operation of construction equipment, work in the water body etc. may disrupt and cause discomfort to fishermen, current fish landing centre users and the local community if adequate mitigation measures are not adopted. The major impacts during the operation phase are anticipated to arise from increased vessel activity and expanded fish landing attracting influx of people and thereby increasing stress on the available natural resources like fresh water.

Several project features mitigate the environmental impacts including:

- CWPRS has designed the breakwaters for the harbour and for river training works in accordance with modelling studies using the site-specific data and optimising the design as per the suggestions of Harbour Engineering Department (HED) after conducting necessary desk studies, for maximum efficient control over river mouth migration and for providing tranquil conditions in the harbour basin.
- The landside facilities are proposed in government owned land and therefore there is no need for land acquisition.
- The project includes comprehensive environmental management measures such as wastewater treatment, improved stormwater drainage, rainwater harvesting, upgraded internal roads and expanded parking facilities.
- No tree cutting is proposed for the project. To improve the ecosystem, the project includes green area development and landscaping.

The anticipated environmental impacts and the corresponding mitigation measures which shall be adopted for construction phase is given in Table 5.

Table 5: Anticipated Impacts and Mitigation Measures for Construction Phase

Anticipated Environmental Impacts	Mitigation Measures Proposed
Excavation, reclamation and construction activities and waste disposal can impact land stability and soil quality	• Reclamation shall be carried out only in the earmarked areas, using the dredged material from maintenance dredging of the river mouth and harbour basin, to the maximum extent. • Construction in and near the water bodies shall be done as per the SOPs prepared • Implement proper waste management practices & restore the site to its original state after construction.
Construction activities may cause pollution, sedimentation and changes in water flow, which negatively impacting surface water, groundwater and marine water quality.	• Groundwater withdrawal shall not be done from CRZ areas. • Turbidity caused during dredging shall be limited by periodically suspending dredging activities when the turbidity spreads beyond the area earmarked for dredging • Drains shall be constructed in initial stages of the construction of the landside facilities for the efficient management of storm water runoff from the site. • Proper storage of oil and fuel at designated locations. • Use portable Sewage Treatment plants (STPs) for treating wastewater generated by the construction workers.
Construction activities and vehicle traffic can generate noise and dust emission, which leading to air and noise pollution and causing inconvenience to the public.	• Regular maintenance of machineries and vehicles and use vehicles with valid PUC. • Use low-emission equipment and maintain the machineries regularly. • Transporting construction materials in covered vehicles • Profile sheet barricades shall be provided around the proposed harbour facilities • Prohibit unnecessary idling of construction vehicle.
Construction activities, oil spills and plastic waste can harm the habitats of terrestrial and marine flora and fauna.	• Training and awareness for the construction workers. • Prompt removal construction debris. • Minimize land and vegetation use outside construction area. • Proper solid waste management. • Safe disposal of oil and other residues.
Health and life risk to workers due to lack of access to potable water, unsanitary conditions and accidents during construction activities.	• Provision for potable water facilities. • Implementation of proper sanitation and waste management system for liquid and solid waste. • Provide training on Health Safety and Environment (HSE) policies, SOPs etc. • Ensure proper use of PPE, enforce safety rules, provide adequate lighting, warning signs, suspend work during heavy

Anticipated Environmental Impacts	Mitigation Measures Proposed
	rains, establish early warning systems, first aid facilities, medical check-up and availability of trained staff for first aid.

The anticipated environmental impacts and corresponding mitigation measures which shall be adopted for operation phase is given in Table 6.

Table 6: Anticipated Impacts and Mitigation Measures for Operation Phase

Anticipated Environmental Impacts	Mitigation Measures proposed
Erosion on southern shoreline, continued migratory nature of the river mouth, disposal of solid and liquid waste, leakage of hazardous waste can impact the land environment	• Well-designed river training works to prevent sedimentation and sand bar formation in the river mouth. However, CWPRS has recommended that if the mouth remain unstable, then then seawall of appropriate length may be provided to arrest the shifting of the river mouth. • CWPRS has also recommended that if erosion progresses on the south coast of the harbour, then suitable shore protection such as seawall or series of groynes may be provided. • Proper liquid and solid waste management measures such as ETP of capacity 15 kLD and source segregation and handing over of solid waste. • Proper storage and handling of hazardous substances.
Increased water requirement, overexploitation of freshwater resources, contamination of waterbody and inadequate stormwater management can impact the water quality.	• Groundwater withdrawal shall be prohibited in CRZ areas. • RWH tanks of capacity 50 kL will be installed. • Reuse of treated water for watering of landscaping area. • Storm water drains with detention tanks shall be provided and it shall be desilted regularly.
Emissions from vessels, vehicles and working machinery can impact air environment and noise environment	• Proper fishing vessel management plan. • Implementation of proper traffic management plan with traffic circulation paths and parking areas within the site.
Increased movement of fishing vessels, over exploitation of marine resources and unsuitable afforestation practices may impact ecology and biodiversity	• Restriction of vessel anchoring and movement in sensitive areas. • Designation of vessel routes and speed restrictions. • Creation of protected areas for critical habitats. • Awareness training for fishers to avoid trapping of species that need environmental protection and against overfishing. • Species and location for green area development shall be selected in consultation with locals.

Anticipated Environmental Impacts	Mitigation Measures proposed
Inadequate sanitation and wastewater management, improper solid waste disposal, accidents and injuries among fishing can impact occupational health and safety.	• Adequate sanitation facilities for workers with adequate water supply with resting rooms facilities • Proper waste management measures for handling solid and liquid wastes • Pest control measures shall be adopted in the harbour premises • Enough staff trained in first aid measures and an ambulance with all necessary facilities shall always be deployed at the harbour.

The Environmental Management Plan (EMP) shall be scrupulously implemented to control the anticipated impacts. The implementation of EMP for the construction phase shall be under the scope of the construction contractor and the implementation of EMP during the operation phase shall be under the scope of HED. The budgetary allocation for EMP is given in Table 7.

Table 7: Budgetary Allocation for EMP

S. No	Environmental Management Measure	Capital Cost (In INR)	Recurring Cost/ year (In INR)
Construction Phase			
1.	Barricades of height 3.0 m around the construction areas	5,25,000	55,000
2.	Vehicle and equipment inspection camp	-	1,00,000
3.	Storm water management by a detention tank and seasonal desilting	55,000	30,000
4.	Wastewater management of 100 workers by providing temporary toilets connected to portable STP	3,75,000	1,05,000
5.	Oil Spill containment kits (Including Absorbent Pads, Absorbent Socks, Disposable Bags, Safety Goggle etc.)	10,000	5,000
6.	Solid waste management by 2 aerobic composting bins for biodegradable wastes and 2 bins for segregation and collection of plastics, paper, cans & others	1,00,000	40,000
7.	Ecological training for the workers on conservation and protection of the environment.	60,000	30,000
8.	Salary of HSE engineer for ensuring EMP is followed	-	3,00,000
9.	Erection of warning sign boards at both the sides	50,000	10,000
10.	HSE training for workers: 2-day induction training before start of construction and refresher training after 6 months	30,000	15,000
11.	PPE (helmet, jacket, shoes, life jacket, harness, googles, life jacket, etc) for 100 workers (working on land and in the sea) along with first aid facilities and water ambulance for workers	5,15,000	80,000
12.	Medical check-up camps for 100 workers, once in 6 months	-	1,00,000
13.	Grievance redressal system for workers	-	40,000

S. No	Environmental Management Measure	Capital Cost (In INR)	Recurring Cost/ year (In INR)
14.	Grievance redressal system for local population	-	40,000
15.	Informing people about construction & restriction on beach	15,000	-
16.	Erecting boards for traffic management within the harbour	35,000	-
17.	Site cleaning and restoration works	30,000	-
18.	EMC meetings, record keeping & site inspections	-	35,000
19.	Environmental Monitoring	-	2,46,000
	Total EMP Cost for Construction Phase	***18,00,000***	***12,31,000***
	Operation Phase		
1.	Maintenance of internal road and parking area	-	2,75,000
2.	Vehicle and equipment inspection camp	-	50,000
3.	Maintenance of RWH tanks of capacity 50 kL	-	50,000
4.	Maintenance and seasonal desilting of the storm water drains and detention tank	-	25,000
5.	Operational cost for proposed ETP of 15 kLD	-	2,10,000
6.	Solid waste management of the harbour by using 2 units of segregation and collection bins (for biodegradables, plastics, paper, cans & others) and handing over of the waste to authorised handlers	-	60,000
7.	Awareness training for fishers on safety, environmental responsibilities, latest eco-friendly & most modern fishing measurers, etc.	-	45,000
8.	Maintenance of landscapes and green belt developed	-	1,10,000
9.	Pest control at the harbour premises, quarterly	-	45,000
10.	Medical check-up for the fishers and workers at the harbour	-	2,00,000
11.	Grievance redressal system for harbour workers & fishers	-	50,000
12.	Maintenance of traffic management boards in the harbour and appointing a traffic warden for regulating traffic	-	10,000
13.	Grievance redressal system for locals	-	50,000
14.	EMC meetings, record keeping and site inspections	-	35,000
15.	Environmental Monitoring	-	2,85,000
16.	Shoreline mapping	-	1,00,000
	Total EMP Cost for Operation Phase	-	***16,00,000***

The total budget allocated for EMP during construction phase is INR 18.00 lakhs as capital cost and INR 12.31 lakhs/year as recurring cost. During operation phase the budget of EMP is INR 16.00 lakhs/year as recurring cost.

10. Emergency Preparedness

The possible naturals hazards in addition to anthropogenic hazards identified for the project include cyclone, lightning, earthquake, drought, flood and costal hazards. The risk to the project due to these

hazards and their consequences were analysed and the mitigation measures were proposed to reduce risks from these hazards. To ensure a seamless transition from normal condition to emergency operations in a systematic manner during the emergency, an Emergency Response Team with appropriate lines of authority with succession planning and actuating the response management at site has been identified. Contact numbers of concerned authorities and nearby emergency facilities are identified and shall be displayed in the site.

11. Public Hearing

This project does not require public hearing as it is a standalone CRZ project

12. Corporate Environmental Responsibility (CER)

CER is not applicable for the project as the project does not attract EIA Notification 2006.

13. Occupational Health Measures

Occupational health impacts occur due to inadequate sanitation, lack of solid waste and wastewater management system, contamination of drinking water sources and spread of waterborne communicable diseases. Lack of adequate safety measures/ training/ PPEs and accidents are also an issue.

To ensure a safe and sustainable construction process, proper waste management practices must be implemented, including portable STP and source segregation of solid waste & onsite composting of food waste. Construction workers should be provided with appropriate number of PPEs and trained on its proper use. First aid kits and a water ambulance shall always be readily available at the construction site. Medical camps for workers shall be arranged once in six months. The construction workers shall be given adequate training on HSE policy, Emergency Response and Disaster Management Plan (ERDMP), SOP for construction, etc.

To ensure proper waste management during operation phase, solid waste segregation at the source and handed over to authorised recyclers or handlers. Fishers must be trained on the importance of wearing appropriate PPE. Regular medical check-ups for fishers and harbour workers are essential for monitoring their health and well-being

14. Post Project Monitoring Plan

Environmental Monitoring Programme (EMoP) has been prepared to monitor the environmental quality during operation phase and shall be carried out through a National Accreditation Board for Testing and Calibration Laboratories (NABL) accredited laboratory. The parameters to be monitored are ambient air, noise level, soil, surface water, marine water, marine sediment, inlet and outlet water from Effluent Treatment Plant (ETP) and stack emissions from DG. The budget for EMoP during construction phase is estimated as INR 2.46 Lakhs/year and for the operation phase is estimated to be INR 2.85 Lakhs/year.

Half yearly compliance reports shall be prepared & submitted to KCZMA/MoEF&CC to ensure transparency and accountability of environmental performance.

Based on the EIA studies and other surveys conducted for the project can be concluded that the potential adverse environmental impacts can be mitigated to an acceptable level by adequate implementation of

the environment management measures. The stipulations in all the statutory compliances such as the CRZ Clearance shall be scrupulously followed and its compliance monitored and reported by the EMC.

Compliance to Standard Terms of References

S. No	Standard ToR	Compliance	Citation
1.	Reasons for selecting the site with details of alternate sites examined/ rejected/ selected on merit with comparative statement and reason/ basis for selection. The examination should justify site suitability in terms of environmental angle, resources sustainability associated with selected site as compared to rejected sites. The analysis should include parameters considered along with weightage criteria for short-listing selected site.	• The project is the construction of a fishing harbour will all necessary facilities for the landing and handling of daily catches at Ajanur, next to the existing Fish Landing Centre (FLC). • The proposed site is at equal distances from the existing fishing harbours at Kasaragod, at Cheruvattur (17 km towards the south of project site) and Kasaragod (17 km towards north of project site). • Hence, the site was identified as the best suited, given the concentration of fishers at Ajanur and its fishing potential, and no alternate sites were considered for this project.	Section 5.2 of Chapter 5
2.	Details of the land use break-up for the proposed project. Details of land use around 10 km radius of the project site. Examine and submit detail of land use around 10 km radius of the project site and map of the project area and 10 km area from boundary of the proposed/ existing project area, delineating project areas notified under the wild life (Protection) Act, 1972/ critically polluted areas as identified by the CPCB from time to time/ notified eco-sensitive areas/ interstate boundaries and international boundaries. Analysis should be made based on latest satellite imagery for land use with raw images.	• Land-use Land Cover Map of 10 km area is prepared with Q-GIS, using Landsat 08 data at 30 m special resolution. • As per LULC Map, 50.73 % of the study area is occupied with water bodies. 26.62 % is vegetation followed by Built-up Area (20.29 %). 2.05 % of the study area is cropland and 0.32 % is of sandy area are found within the 10 km study area. • There are no areas notified under the Wildlife (Protection) Act, 1972/ critically polluted areas as identified by the CPCB from time to time/ notified eco-sensitive areas/ interstate boundaries and international boundaries within 10 km radius of the proposed project site.	Section 1.7.2 of Chapter 1

S. No	Standard ToR	Compliance	Citation
3.	Submit the present land use and permission required for any conversion such as forest, agriculture etc. land acquisition status, rehabilitation of communities/ villages and present status of such activities.	• There is no land acquisition or R&R involved as the project is proposed in 'Puramboke' land owned by the government. • No forest land or agriculture land will be converted for the project.	Section 2.7.1 of Chapter 2
4.	Examine and submit the water bodies including the seasonal ones within the corridor of impacts along with their status, volumetric capacity, quality likely impacts on them due to the project.	• The project site is located in the perennial water bodies: Arabian Sea and Chithari River. • The average current velocity of the Chithari River near the mouth is 0.007 m/s during non-monsoon season and 0.015 m/s during the monsoon season. The average current in the Arabian sea at the proposed end of the river training breakwater, at the harbour entrance and inside the harbour is 0.43 m/s, 0.38 m/s, and 0.39 m/s respectively during the non-monsoon season and 0.55 m/s, 0.46 m/s and 0.49 m/s respectively during the monsoon season. • The quality of the marine water and marine sediment at these water bodies were monitored and according the anticipated impacts have been identified.	Table 2.3 of Chapter 2, Section 3.6.4 of Chapter 3, Section 4.4.2 and 4.5.2 of Chapter 4 and section 7.4 of Chapter 7.
5.	Submit a copy of the contour plan with slopes, drainage pattern of the site and surrounding area.	• The contour map of 10 km study area is prepared using Digital Elevation Model (DEM), with an interval of 20 m along with slope map and drainage pattern. • As per DEM data, the highest elevation of study area is 185 m Above Mean Sea Level (AMSL) and lowest elevation is -7 m AMSL. • The slope ranged from 0 to 29°. • The area features dendritic drainage pattern of sea, rivers, canals and lakes.	Section 3.5.2 and 3.6.2 of Chapter 3.

S. No	Standard ToR	Compliance	Citation
6.	Submit the details of terrain, level with respect to MSL, filling required, source of filling materials and transportation details etc.	• Elevation map of 10 km prepared using DEM with 20.0 m contour interval shows that the highest elevation is 185 m AMSL and lowest elevation is -7 m AMSL. • Filling is required for foundation trenches of harbour facilities, which will be done through excess excavated earth or earth brought by the contractor. • Around 40 trucks are expected per day to bring construction materials to the harbour for the proposed constructions	Section 3.5.2 of Chapter 3. Table 4.3 of Chapter 4. Section 2.7.5 of Chapter 2.
7.	Examine road/ rail connectivity to the project site and impact on the existing traffic network due to the proposed project/ activities. A detailed traffic and transportation study should be made for existing and projected passenger and cargo traffic.	• The project has its access from a public road of width about 5 m that connects to the Kanhangad Kadappuram road junction. • From there it connects to the Palayi – Kanhangad Road – 0.85 km, SSE of southern breakwater, • which subsequently connects to State Highway (SH) 57. • During the construction phase, the traffic to the proposed site will be increased as about 40 trucks per day are estimated for the conveyance of construction materials to the site. • During the operation phase, it is estimated that about 80 vehicles, which includes trucks, auto-rickshaws, and 2 wheelers will be visiting the harbour to convey the daily catch to the customers and markets.	Table 2.2, Figure 2.4, and section 2.7.5 of Chapter 2.
8.	Submit details regarding R&R involved in the project.	There is no land acquisition and therefore R&R involved as the project is proposed in the government 'Puramboke' land next to the existing FLC.	Section 2.7.1 of Chapter 2 and Section 7.2 of Chapter 7.

S. No	Standard ToR	Compliance	Citation
9.	Submit a copy of layout superimposed on the HTL/LTL map demarcated by an authorized agency on 1:4000 scale along with the recommendation of the SCZMA.	• NCESS prepared the CRZ Status Report and the HTL/LTL map in 1:4000 scale superimposing the project layout. • As per the CRZ mapping, the project site falls under CRZ IA, CRZ IB, CRZ II, CRZ-IV A, and CRZ-IV B.	Section 7.3 of Chapter 7.
10.	Submit the status of shore line change at the project site	• The major change in the shoreline of Ajanur is due to the shift of the river mouth. • From the Google Earth imageries, the shift in river mouth is very evident • Shoreline modeling studies were done by Central Water and Power Research Station (CWPRS) for the proposed alignment, which revealed that the northern side is expected to experience accretion, extending 2.5 km along the coast and 68 m seaward and the southern side is projected to erode, with a potential loss of 1.5 km along the coast and 40 m in cross-shore direction. It is observed that the shifting of the river mouth is about 0.2 km towards the north over a year.	Section 1.11 and Figure 1.1 of Chapter 1 Section 7.4 of Chapter 7
11.	Details of the layout plan including details of channel, breakwaters, dredging, disposal and reclamation.	• Construction of 425 m long south breakwater. • River training for the Chithari River through a 435 m long breakwater. • Development of landside facilities for the harbour with wharf & auction hall, shops, toilet facilities, Effluent Treatment Plant (ETP), solar panels, Rain Water Harvesting (RWH) tanks, smart infrastructural facilities, etc. • Creation of a 400 m long reclamation bund. • Dredging activities between the north breakwater and the river training structure at the Chithari River mouth.	Section 2.5 of Chapter 2

S. No	Standard ToR	Compliance	Citation
12.	Details of handling of each cargo, storage, transport along with spillage control, dust preventive measures. In case of coal, mineral cargo, details of storage and closed conveyance, dust suppression and prevention filters.	• The total fish landing capacity after the construction of the harbour is estimated to be 28,695 TPA. • The fishes will be brought to the harbour in fishing vessels of size 8 m, 10 m and 15 m. • About 80 vehicles, mainly trucks and auto-rickshaw, apart from few two wheelers are anticipated per day to transport the daily catch to nearby markets and consumers. • To control dust emissions from the vehicular movement, new paved internal roads and parking areas along with improvement of access roads are proposed.	Section 2.4, 2.7.5 and 2.9.4 of Chapter 2.
13.	Submit the details of fishing activity and likely impacts on the fishing activity due to the project. Specific study on effects of construction activity and pile driving on marine life.	• The unavailability of adequate fish landing facilities and difficulties in navigating the river mouth limits the number of fishing days. With the establishment of the fishing harbour, the number of safe fishing days at the proposed harbour is estimated to be 300 days. • The total fish handling capacity of the Ajanur harbour will be increased to a total of 28,695 TPA. • The proposed developments involve construction of breakwater, dredging and drilling of concrete piles for the wharfs and auction hall, which will create disturbance of bed sediment in water column. The impacts envisaged on marine water quality due to construction activities will be significant but temporary and reversible.	Section 2.4 of Chapter 2 and Section 4.4.5 of Chapter 4.
14.	Details of oil spill contingency plan.	• Non-motorized boats of 8 m length, motorized mechanical boats of 10 m length and motorized non-mechanical	Section 4.4.1 and 4.4.2 of

S. No	Standard ToR	Compliance	Citation
		boats of length 15 m will be operated at the Fishing Harbour and hence handling of oil is not envisaged at the harbour. • However, to manage accidental minor spill from the construction site, it shall be made sure that oil spill containment kits (including absorbent pads, absorbent socks, disposable bags, safety goggle etc.) are available at the construction site and shall be promptly used.	Chapter 4 and Section 10.3.2 and 10.8 of Chapter 10.
15.	Details of bathymetry study.	• The bathymetry of the proposed site with and without the proposed harbour was estimated using Acoustic Doppler Current Profiler (ADCP) by CWPRS.	Section 7.4 of Chapter 7.
16.	Details of ship tranquillity study	• Design of the breakwaters were done taking into consideration the following data to provide tranquil condition in the harbour: o Design Water Level (DWL) - 2.60 m (which is 1.20 m above the Mean Higher High Water) o Storm Surge of 0.80 m + Sea level rise of 0.40 m o Significant wave height of 4.0 m • This design ensures the breakwater's ability to provide tranquil conditions in the harbour, protecting it from strong wave action while minimizing overtopping and structural damage.	Section 7.5 of Chapter 7
17.	Examine the details of water requirement, impact on competitive user, treatment details, use of treated waste water. Prepare a water balance chart.	• During the construction phase, the water required for construction workers will be 4.5 kLD and for the construction activities will be 2 kLD. The water will be sourced from a nearby pump house and an open well outside the CRZ area. • During the operation phase, the fresh water requirement will be 16 kLD for cleaning of the fish handling area and	Section 2.7.2 and Section 2.9.1 of Chapter 2

S. No	Standard ToR	Compliance	Citation
		for domestic and flushing purposes of the operation workers. The water for the operation phase also will be sourced from the nearby pump house and open well, and harvested rainwater from the proposed RWH. • Water balance chart has been prepared and accordingly the wastewater generated from the project will be 15 kLD which will be treated in an ETP of capacity 15 kLD. • The treated water from the ETP will be recycled and used for landscaping.	
18.	Details of rainwater harvesting and utilization of rain water	• Rainwater Harvesting (RWH) tank of capacity 15 kLD is proposed to be provided at the landside facilities The harvested rainwater will used after filtration and disinfection, as a fresh water source for the operations at the harbour.	Section 2.7.2.1 of Chapter 2.
19.	Examine details of solid waste generation, treatment and its disposal.	• The dredged spoil remaining after reusing it for construction of the reclamation bund. • During construction phase, the solid waste generated by the construction workers is estimated to be 4 kg/day as biodegradable waste, which shall be managed using aerobic composting bins. The non-biodegradable waste generated by the workers will be 6 kg/day, which will be segregated at source to plastic, recycles, etc. and shall be timely handed over to recyclers. • During the operation phase, the solid waste generated by the operation staff will be 1.5 kg/day. All waste generated at the project shall be segregated at source and shall be managed by handing over to authorized recyclers/ handlers.	Section 2.9.3 of Chapter 2 and Section 10.3.3 of Chapter 10.

S. No	Standard ToR	Compliance	Citation
20.	Details of desalination plant and the study for outfall and intake.	Not applicable as desalination plant is not proposed in the Ajanur Fishing Harbour.	-
21.	Examine baseline environmental quality along with projected incremental load due to the proposed project/activities.	• The baseline quality of ambient air, noise levels, surface water, marine water, soil, and marine sediments were monitored. • The anticipate impacts on the baseline environments due to the proposed project have been evaluated and adequate mitigation measures have been suggested.	Chapter 3 and Chapter 4
22.	The air quality monitoring should be carried out according to the notification issued on 16th November, 2009.	The air quality monitoring has been carried out at 3 locations to measure the PM_{10}, $PM_{2.5}$, SO_2, NO_2 and CO	Section 3.7 of Chapter 3
23.	Examine separately the details for construction and operation phases both for Environmental Management Plan and Environmental Monitoring Plan with cost and parameters.	• The estimated budget for EMP is INR 18.00 lakhs as capital cost and INR 12.31 lakhs/year as recurring cost during construction phase. • During operation phase, the cost for EMP is estimated to be INR 16.00 lakhs/year. • Environmental Monitoring Plan have been developed which includes monitoring air, noise, soil, water, and marine environments. The budget for environmental monitoring for construction phase is estimated to be INR 2.46 Lakhs/year, and for the operation phase, is INR 2.85 Lakhs/year.	Chapter 10 and Chapter 6
24.	Submit details of a comprehensive Risk Assessment and Disaster Management Plan including emergency evacuation during natural and man-made disasters	• The project faces risks from natural hazards like coastal hazards, cyclones, floods, earthquake, drought, and lightning, in addition to anthropogenic hazards. These risks are assessed, and mitigation measures are proposed.	Section 7.6 of Chapter 7.

S. No	Standard ToR	Compliance	Citation
		• An Emergency Response Team will be formed to handle emergencies effectively. Contact information for relevant authorities and nearby emergency facilities shall be displayed on the site.	
25.	Submit details of the trees to be cut including their species and whether it also involves any protected or endangered species. Measures taken to reduce the number of the trees to be removed should be explained in detail. Submit the details of compensatory plantation. Explore the possibilities of relocating the existing trees.	No trees are proposed to be cut for the project.	Section 2.7.1 of Chapter 2
26.	Examine the details of afforestation measures indicating land and financial outlay. Landscape plan, green belts and open spaces may be described. A thick green belt should be planned all around the nearest settlement to mitigate noise and vibrations. The identification of species/ plants should be made based on the botanical studies.	• Landscaping and green area development of 3,000 m^2 is proposed along with the project. • This will be developed as a green belt of thickness 5 m. • The species such as Vaga, Ezhilamppala, Ariyaveppu, etc. shall be planted in the green belt.	Table 2.7, under Section 2.5.3 of Chapter 2 and Table 10.2 of Chapter 10
27.	The Public Hearing should be conducted for the project in accordance with provisions of Environmental Impact Assessment Notification, 2006 and the issues raised by the public should be addressed in the Environmental Management Plan. The Public Hearing should be conducted based on the ToR letter issued by the Ministry and not on the basis of Minutes of the Meeting available on the web-site.	This project does not fall under the purview of the EIA Notification of 2006 and therefore public hearing is not required.	Section 7.1 of Chapter 7.

S. No	Standard ToR	Compliance	Citation
28.	A detailed draft EIA/EMP report should be prepared in accordance with the above additional TOR and should be submitted to the Ministry in accordance with the Notification	The EIA report for the project was prepared in accordance with EIA Notification 2006 and its amendments. The study followed the Standard ToR for conducting EIA study for Ports and Harbours issued by the MoEF&CC and EIA guidance manual for Ports and Harbours. Additional ToR was not obtained for the project as it is not mandated as per CRZ Notification 2019.	Section 1.7 of Chapter 1.
29.	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given	No litigations or court orders pending against the land or proponent or project	Section 1.9 of Chapter 1
30.	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out	The estimated project cost for the proposed project is INR 20,000 Lakhs. The estimated EMP budget includes a capital cost of INR 18.00 lakhs and recurring cost of INR 12.31 lakhs/year during construction phase. For the operation phase, the estimated cost for EMP is INR 16.00 lakhs/year.	Section 2.12 of Chapter 2 & Section 10.8 of Chapter 10
31.	Any further clarification on carrying out the above studies including anticipated impacts due to the project and mitigative measure, project proponent can refer to the model ToR available on Ministry website "http://moef.nic.in/Manual/Port and harbour"	Noted	-

Chapter 1 Introduction

1.1 Purpose of the Report

The Harbour Engineering Department (HED) proposes the construction of Ajanur Fishing Harbour at Ajanur Village, Kasaragod Taluk, Kasaragod District, Kerala. The fishing harbour is designed to have a fish handling capacity of 28,695 Tonnes Per Annum (TPA). The project attracts the Coastal Regulation Zone (CRZ) Notification 2019, as it falls in CRZ IA, CRZ IB, CRZ II, CRZ IV A and CRZ IV B and hence Environmental Impact Assessment (EIA) is required to assess potential environmental impacts, to propose mitigation measures, and formulate an Environmental Management Plan (EMP). ULTRA TECH has been entrusted by HED to prepare the EIA report for submission to the Kerala Coastal Zone Management Authority (KCZMA) to obtain CRZ clearance.

1.2 Identification of the Project Proponent

The HED of Government of Kerala is the project proponent. The details of the authorised signatory and the address for correspondence is given in Table 1.1.

Table 1.1: Details of Authorised Signatory and Address for Correspondence

Particulars	Descriptions
Address for correspondence	Office of the Executive Engineer, Harbour Engineering Kasaragod Division, Clock Tower Junction, Near Railway Station, Kasaragod, Kerala – 671 121
Email id	eekgd.hed@kerala.gov.in

1.3 Identification of the Project

The project is proposed to address the issues faced by the local fishing community and the fishery industry in the region, which operates near the Chithari River. Fishers at Ajanur currently face challenges in their day-to-day fishing activities due to the migratory nature and periodic closing of the Chithari River mouth, and inadequate fish handling facilities at the existing Fish Landing Centre (FLC). Existing FLC includes only a dilapidated auction hall, net mending shed and toilet block. The master plan for the project involves the following features:

- North and south breakwaters for establishing the harbour basin and river training wall.
- Landside facilities of the harbour which include wharf, auction hall, berthing wharf, canteen, net mending shed, shop rooms, locker rooms, gate and gate house, office cum surveillance room, Rain Water Harvesting, Effluent Treatment Plant (ETP), etc.
- For the stabilization of the river mouth, a river training wall on the north side of the mouth, dredging and reclamation is proposed in accordance with the modelling studies conducted by Central Water & Power Research Station (CWPRS), Pune.

1.4 Brief description of the nature, size and location of the project

Brief description of the project is given in Table 1.2.

Table 1.2: Brief Description of the Project

<table>
<tr><th>Particulars</th><th>Descriptions</th></tr>
<tr><td colspan="2">Location Details</td></tr>
<tr><td>Village & Panchayath</td><td>Ajanur</td></tr>
<tr><td>Taluk & District</td><td>Kasaragod</td></tr>
<tr><td>State</td><td>Kerala</td></tr>
<tr><td colspan="2">Project Details</td></tr>
<tr><td>Proposed features</td><td>• Northern breakwater of length 1,150 m
• Southern breakwater of length 425 m
• River training work of Chithari river in the form of a breakwater of length 435 m
• Reclamation bund of length 400 m
• Wharf of dimension 120 m × 6.6 m
• Auction hall of dimension 60 m × 15 m
• Dredging proposed in between the north breakwater and river training work at the mouth of Chithari river
• 2-story building including canteen, rest shed, locker room, gear shed
• Other buildings such as toilet block, workshop building, office room cum harbour surveillance camera room.
• ETP, RWH facility landscaping and green belt
• Mechanical conveyor system & Automation
• Electrification and Installation of Solar energy system
• Gate and Gate House with ATM and toll booth.
• Water supply arrangements in the harbour with overhead tank and sump
• Construction of wharf for berthing facility
• Navigational aid, pressure washer and cleaning equipment,
• Development of green area, approach road, internal road, parking area, drainage facility, compound wall and side protection work
• Development of smart infrastructure and automated systems</td></tr>
<tr><td>CRZ Zone</td><td><table>
<tr><th>CRZ Zone</th><th>Length (m)</th><th>Area (m^2)</th></tr>
<tr><td>CRZ IA</td><td>16.48</td><td>-</td></tr>
<tr><td>CRZ IB</td><td>187.68</td><td>11,181.91</td></tr>
<tr><td>CRZ II</td><td>719.08</td><td>3,636.97</td></tr>
<tr><td>CRZ IVA</td><td>749.14</td><td>44,911.33</td></tr>
<tr><td>CRZ IVB</td><td>-</td><td>94.60</td></tr>
<tr><td>Total</td><td>1,672.38</td><td>59,824.81</td></tr>
</table></td></tr>
<tr><td>Fish landing capacity</td><td>28,695 TPA</td></tr>
</table>

Particulars	Descriptions
Project cost	INR 20,000 Lakhs
Construction period	46 months

1.5 Importance of the Project to the Region and Country

The proposed project responds to a longstanding need for improved fishing infrastructure in Kasaragod District, where fishing is a primary livelihood. With a coastline of 70 km and an annual fish landing of 35,163 tonnes, the district heavily depends on the fishing industry. The migratory nature of the Chithari river mouth and absence of safe fish landing facilities pose life threatening conditions to the fishers bringing back their catch. The existing harbour consists only a dilapidated auction hall and a toilet block. These landside infrastructures lack adequate facilities for handling the catches and meeting the basic needs of fishers. The proposed harbour will provide safer fish landing and handling facilities and also benefit mechanized and traditional fishing in the area by providing modern infrastructure facilities, enhancing the safety and efficiency of fishing operations. The harbour will serve as a vital hub for nearby fishing villages, Hosdurg, Ajanur and Pallikkara, directly benefiting around 7,094 people involved in the fishing industry.

1.6 Scope of the EIA Study

EIA study for the proposed project has been undertaken based on EIA Notification, 2006 (amended thereof) from Ministry of Environment, Forest and Climate Change (MoEF&CC). This EIA report for the proposed fishing harbour is prepared as per the Standard Terms of Reference (ToR) for conducting EIA study for Ports and Harbours issued by the MoEF&CC, April 2015 and EIA guidance manual for Ports and Harbours prepared by Administrative Staff College of India.

1.6.1. Environmental Legislative Framework

Understanding of the applicable environmental legislation and guiding principles is crucial for the determination of compliance with the statutory requirements and environmental standards. The environmental legislation relevant to the project listed in Table 1.3.

Table 1.3: Environmental Legislative Framework

S No	Act/Rule /Notification Guidelines by MoEF&CC	Applicability (Yes/No)	Project specific applicability	Regulatory Authority
1.	The Wildlife (Protection) Act, 1972 and subsequent amendments	No	The project site does not come within 10 km boundary of any protected areas as per the Wildlife (Protection) Act	National Board for Wildlife (NBWL)
2.	Water (Prevention and Control of Pollution) Act, 1974 as amended	Yes	ETP is proposed in the landside facilities of the harbour. Consent to Establish (CTE) and Consent to Operate (CTO) from the Kerala State Pollution	KSPCB

S No	Act/Rule /Notification Guidelines by MoEF&CC	Applicability (Yes/No)	Project specific applicability	Regulatory Authority
			Control Board (KSPCB) is required.	
3.	Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 and subsequent amendments	No	Forest Clearance is not required as the project does not involve any forest land	MoEF&CC
4.	Air (Prevention and Control of Pollution) Act, 1981 as amended	Yes	Air pollution control measures in the operation phase for the emissions from the Diesel Generator (DG) set and other machineries used. CTE and CTO from the KSPCB is required.	KSPCB
5.	Environment (Protection) Act, 1986 amended in 1991 and Environment (Protection) rules, 1986 as amended	Yes	No permit required, but rules shall be followed during the construction and operation phase, without any emission or discharge of any environmental pollutants in quantities exceeding the standards issued by KSPCB	MoEF&CC and KSPCB
6.	Noise Pollution (Regulation & Control) Rules, 2000	Yes	Machineries and vehicles used in the construction and operation phase to conform to the standards specified by KSPCB	KSPCB
7.	EIA Notification 2006 and subsequent amendments	No	The Schedule of S.O. 1533 dated 14.09.2006 issued by the MoEF&CC, depicts the 'list of projects or activities requiring prior EC'. As the fish handling capacity of the proposed fishing harbour will be 28,695 TPA, which is less than the threshold limit of 30,000 TPA as amended in the EIA Notification 2006 vide S.O. 3194 (E) dated 14.07.2022, EC is not required for the project	SEIAA or MoEF&CC

S No	Act/Rule /Notification Guidelines by MoEF&CC	Applicability (Yes/No)	Project specific applicability	Regulatory Authority
8.	Solid Waste Management Rules, 2016	Yes	Rules shall be followed for the segregation, storage, handing over and disposal of solid waste.	KSPCB
9.	Construction & Demolition (C&D) Waste Management Rules 2016	Yes	The C&D waste generated from the construction of landside infrastructure shall be managed as per the said rules.	KSPCB
10.	Hazardous and other Wastes (Management and Trans boundary Movement) Rules, 2016 as amended	Yes	Rules shall be followed for the safe storage of used oil from diesel engines of fishing vessels. Hazardous wastes shall be handed over to authorized dealers.	KSPCB
11.	Plastic Waste (Management and Handling) Rules, 2016 and its amendments	Yes	Segregation of plastic waste generated like fishing nets, etc. and handover to recyclers. Use of banned plastic products shall be strictly avoided.	KSPCB
12.	Coastal Regulation Zone (CRZ) Notification 2019 and subsequent amendments	Yes	Project site falls within CRZ IA, CRZ IB, CRZ II, CRZ-IV A and CRZ-IV B. Hence CRZ Clearance is required.	KCZMA
13.	E-waste (Management) Rules, 2022	No	No generation of E-waste anticipated.	KSPCB
14.	Batteries Management and Rules, 2022	No	No use of lead acid batteries	KSPCB

As per the amendment to the CRZ Notification 2019, dated 28th November 2014, the authority for issuing CRZ Clearance for projects not attracting the EIA notification 2006 is SEIAA, unless it is an activity listed under paragraph 4 (ii) of the CRZ Notification 2019. The CRZ Clearance for the proposed project is to be obtained from SEIAA, Kerala after obtaining recommendations from KCZMA.

1.7 Status of Litigations/ Court Orders: Land & proponent

There are no litigations or court orders pending against the land or the project

1.8 Site History

From DPR prepared by HED, desktop study using Google Earth Pro (from the year 2011 to 2025) and consultation with the local people, the details regarding the site's history were gathered. It is revealed that the Chithari river mouth is of migratory nature. The Google Earth imagery showing the shifting of the Chithari river mouth at different years is shown in Figure 1.1.



Figure 1.1: Google Earth Imagery showing shifting of Chithari River mouth

The following observations are made from the Google Earth imagery:

- Google earth imagery from February 2011 to March 2025 shows that the river mouth is migratory in nature, making it difficult for fishermen to navigate
- Imagery dated January 2017 & January 2022 shows that the river mouth is completely closed, preventing fishermen from accessing the sea and severely impacting their fishing activities
- Imagery of December 2013 and October 2018 shows the river mouth opened towards the sea, but its intricate shape and sand bars caused fishermen to face extreme danger and damage to existing auction hall
- In present year, the river mouth is shifted towards the north, showing the migratory nature of the Chithari river mouth

Chapter 2 Project Description

2.1 Type of Project

The proposed Ajanur Fishing Harbour project entails constructing an open-sea harbour with north and south breakwaters along with a river training wall to stabilize the migratory Chithari river mouth and prevent sandbar formation, mitigating associated risks to human life and property of the fishers. Additionally, the project encompasses the development of onshore infrastructure to support the fishing community by providing wharf and auction hall, berthing wharf, canteen, net mending shed, shop rooms, locker rooms, gate and gate house, office cum surveillance room, ETP etc.

2.2 Need and Justification of the Project

- Sand bars at Chithari River mouth endanger fishermen, causing loss of life and vessel damage. Over 500 fishing vessels experience significant challenges in navigating the area.
- Southward shift of the river mouth has damaged auction hall and existing roads. Therefore, new auction hall is planned to be built for providing a designated space for fishermen to sell their catch.
- Existing fish landing centre lacks berthing facilities, leaving boats and equipment on the beach, where they risk damage or being washed away. To address this, wharfs are proposed for safe landing, berthing and vessel repairs.
- By constructing northern and southern breakwaters and river training wall, the Chithari River mouth can be stabilized, preventing its closure during the summer months. This will mitigate the risk of flash floods and safeguard both coastal and upstream communities, along with providing sheltered and calm basin for the landing of the boats.
- For the safe storage of the tools and equipment of the fishers, locker rooms, office room cum harbour surveillance camera room, gate and gate house, etc. will be provided. All other necessary landside facilities are proposed in the harbour to ensure uninterrupted fishing operations.
- The enhanced infrastructure facilities can meet the growing demands of the fishing community and maintain hygienic standards and encourage sustainable fishing practices as outlined by the Food and Agriculture Organization (FAO).

The photographs showing need for the project is given in Figure 2.1.







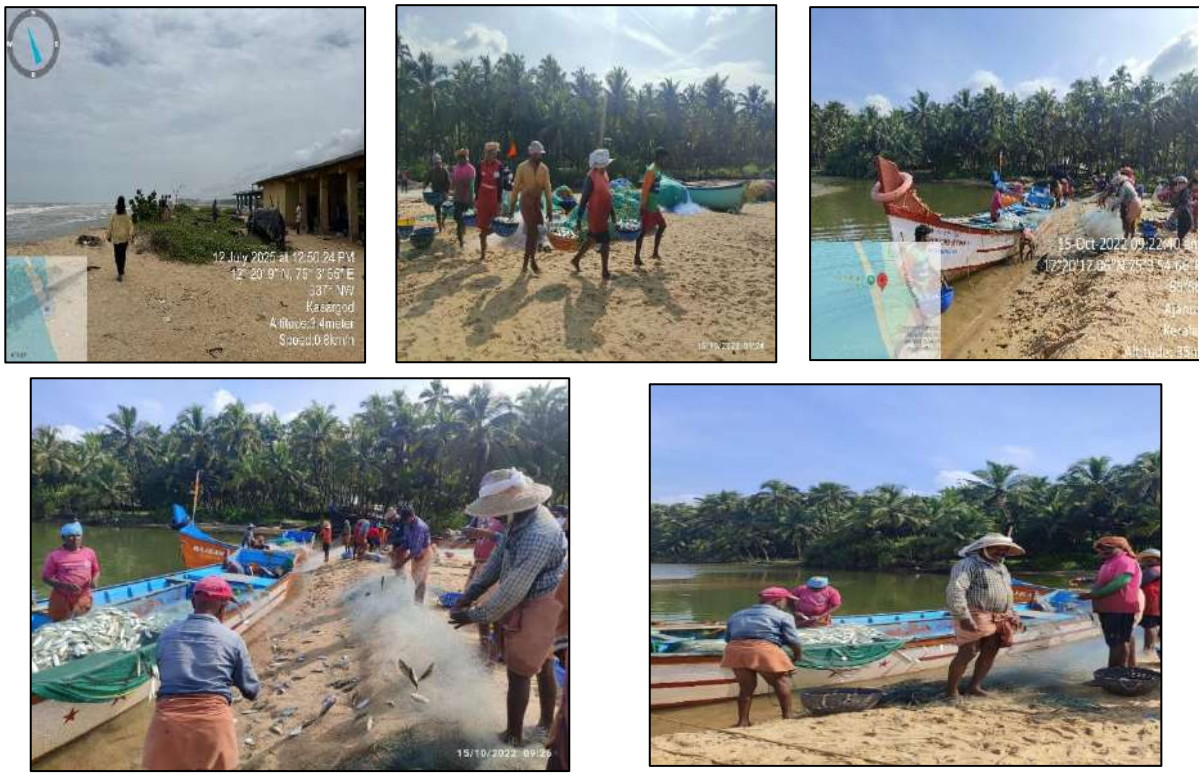


Figure 2.1: Need for the project

2.3 Location and Layout

The details of the location of proposed project site are given in Table 2.1.

Table 2.1: Location details of Proposed Project Site

S. No	Aspects	Details
1.	Geographical Co-ordinates of proposed facilities	Northern breakwater: 12°20'11.66"N, 75° 3'53.04"E Southern breakwater: 12°19'55.64"N, 75° 3'58.95"E River training works: 12°20'17.39"N, 75° 3'51.34"E Fishing Harbor facilities: 12°20'10.18"N, 75° 3'54.87"E
2.	Village	Ajanur
3.	Taluk	Kasaragod
4.	District	Kasaragod
5.	State	Kerala

The index map for the proposed project location is given in Figure 2.2.

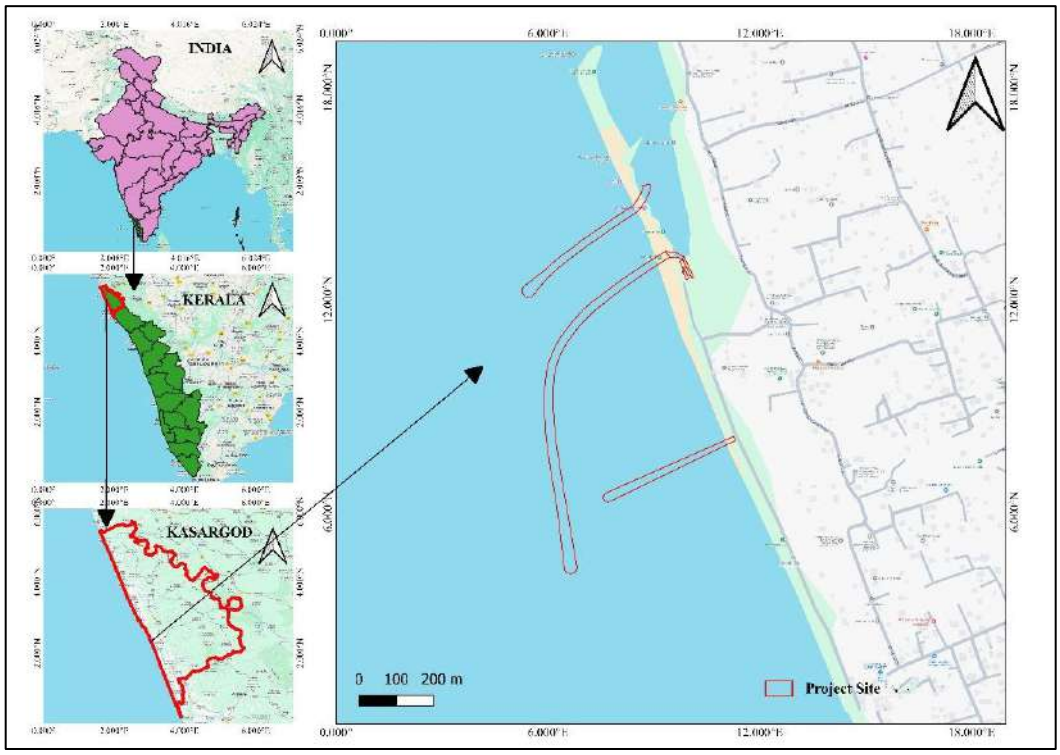


Figure 2.2: Index Map of the Proposed Project Site

Google Earth imagery of the project location is shown in Figure 2.3.



Figure 2.3: Google Earth Imagery of the Project Location

The proposed project site is at a distance of 2.4 km from State Highway (SH) 57 (Kasaragod – Kanhangad Highway). The access road to project site has a width of around 5 m. Existing FLC can be directly accessed from this public road. The Crescent Road and Palayi - Kanhangad Road links the

access road with SH 57. It is proposed to renovate the internal roads and approach road to the proposed fishing harbour facilities. The connectivity to the proposed project site is shown in Figure 2.4.

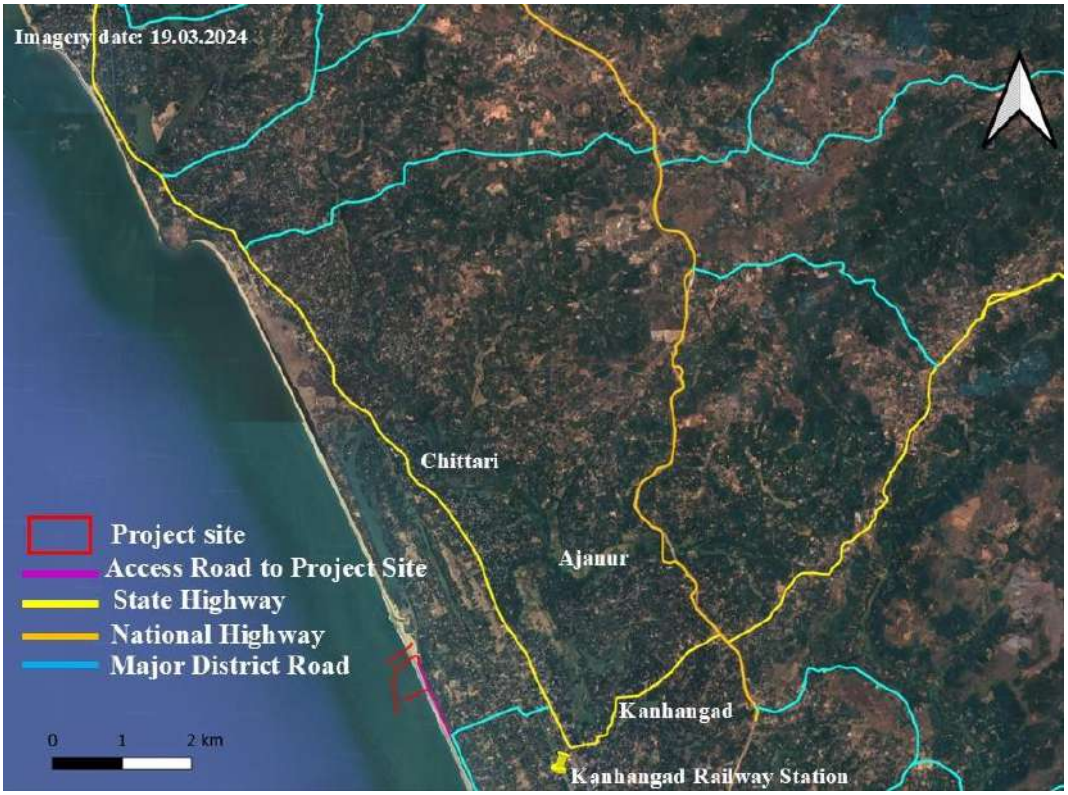


Figure 2.4: Connectivity Map of Project Site

A brief of the connectivity to the project site is given in Table 2.2.

Table 2.2: Connectivity to the Proposed Project Site

Particulars	Details with road distances
Nearest Roads	• Approach Road: Road connecting Kanhangad Kadappuram road junction to the existing FLC • Palayi – Kanhangad Road – 0.85 km, SSE of southern breakwater
Nearest Highways	• SH 57 – 2.4 km, E of southern breakwater • National Highway (NH) 66 – 5.6 km, E from southern breakwater
Nearest railway station	Kanhangad Railway Station - 4 km, SE from southern breakwater
Nearest Airport	Kannur International Airport– 88 km, SE from southern breakwater
Nearest town/City	Kanhangad – 4 km SE from southern breakwater.
Densely populated area	Kanhangad – 4 km SE from southern breakwater.

The environmental setting 10.0 km study area is given in Table 2.3.

Table 2.3: Environmental Setting within 10.0 km Study Area

S. No.	Item	Details
1.	Major water bodies	• Lakshadweep Sea - 0 km, SW from Southern Breakwater • Chithari River – 0 km, NNW from Northern Breakwater • Pulluru stream – 4.7 km, NE from from Southern Breakwater • Chemmattam vayal wetlands – 5.21 km, ESE from Southern Breakwater • Karingode River- 6.17 km, ESE from Southern Breakwater • Madikkai stream- 6.5 km, SE from Southern Breakwater • Vazhakkodchal – 6.70 km, SE from Southern Breakwater
2.	Reservoirs/dams	Nambiarkal dam - 9.09 km, SE from Southern Breakwater
3.	Ecologically sensitive areas; Important Coastal & Marine Biodiversity Areas (ICMBAs), Biodiversity Heritage Site*.	None within 10 km study area
4.	Protected areas as per the Wildlife Protection Act (Tiger reserve, Elephant reserve, Biospheres, National parks, Wildlife sanctuaries (WLS), community reserves, and conservation reserves)	
5.	Reserved / Protected / Forests	
6.	Unique or threatened ecosystem	
7.	Notified groundwater zone by CGWA	Safe (Chirayinkeezhu Taluk)
8.	Critically environmental polluted area	None within 10 km radius
9.	Coastal areas rich in corals, mangroves, breeding grounds of specific species	
10.	Estuaries rich in mangroves, breeding ground of specific species	
11.	Historically important places	Bekal Fort – 7.1 km, NW from Northern Breakwater
12.	Hazard Zones as per the Landslide Susceptibility Zonation Map issued by KSDMA	Low Hazard Zone: 6.5 km, E from Northern Breakwater Medium Hazard Zone: None within 10 km radius High Hazard Zone: None within 10 km radius

S. No.	Item	Details
13.	Seismicity	The proposed project site is in Seismic Zone III as per IS: 1893.

** Total of 106 coastal and marine sites have been identified and prioritized as Important Coastal and Marine Areas (ICMBAs) by Wildlife Institute of India (WII).* [2]**.**

The social setting of 10.0 km study area is given in Table 2.4. It was noted that defence installation and major industries are not present within 10.0 km study area.

Table 2.4: Social Setting within 10 km Study Area

S. No.	Item	Distance	Direction
Hospitals			
1.	Family Health Centre, Ajanur, Kanhangad	0.73 km	SSE from Southern breakwater
2.	New Life Maternity Hospital, Athinhal	1.39 km	NE from Northern breakwater
3.	Kerala Hospital, Athinhal	1.54 km	ENE from Southern breakwater
Schools			
1.	Crescent School, New Building, Kothikkal	0.32 km	NE from Southern breakwater
2.	Sree Kurumba English Medium School	0.44 km	SE from Southern breakwater
3.	G.F.U.P.S Ajanur Kadappuram - School	0.75 km	SE from Southern breakwater
Colleges			
1.	SISS College of Arts and Science, Kanhangad	1.80 km	NNE from Northern breakwater
2.	Navabharath Science College, Kanhangad	2.19 km	ESE from Southern breakwater
3.	Universal College, Kanhangad	2.21 km	SE from Southern breakwater
Temple			
1.	Sree Kurumba Bhagavathy Temple	0.33 km	SE from Southern breakwater
2.	Kolavayal Sree Rajarajeshwari Temple	0.58 km	ENE from Northern breakwater
3.	Adimayil Sree Shaktheya Devi Temple	1.00 km	ENE from Northern breakwater
Church			
1.	Elohim Christ Church Kanhangad	2.0 km	ESE from Southern breakwater
2.	Pioneer Missionary Church, Kanhangad	2.13 km	SE from Southern breakwater
3.	Infant Jesus Forane Church, Kanhangad	2.59 km	SE from Southern breakwater
Mosque			
1.	Muhiyudheen Juma Masjid Kothikkal	0.33 km	NNE from Southern backwater
2.	Muttumthala Juma Masjid, Muttumthala	0.99 km	NNEE from Northern backwater
3.	Sidiqual Bilal Masjid, Ettammal	1.03 km	ESE from Southern backwater

2.4 Size/ Magnitude of the Project

The salient features of the proposed project and the magnitude are given in Table 2.5.

([2]) wiienvis.nic.in/Database/ICMBAs_8247.aspx

Table 2.5: Salient Feature of the Proposed Project

<table>
<tr><th>Particulars</th><th>Description</th></tr>
<tr><td>Proposed constructions</td><td>• Northern breakwater of length 1,150 m
• Southern breakwater of length 425 m
• River training work of Chithari river in the form of a breakwater of length 435 m
• Landside facilities for the harbour
• Reclamation bund of 400 m length.
• Dredging in between the north breakwater and river training work at the mouth of river Chithari</td></tr>
<tr><td>Fish landing capacity</td><td>28,695 TPA</td></tr>
<tr><td>Details of fishing vessels</td><td>
<table>
<tr><th>Overall Vessel Length (m)</th><th>No. of Vessels</th><th>Fishing Trip (Days)</th><th>Fishing Trips per Year</th><th>Average Daily Landing (kg)</th><th>Fish Landing Capacity/Year (kg)</th></tr>
<tr><td>8</td><td>30</td><td>1</td><td>220</td><td>50</td><td>3,30,000</td></tr>
<tr><td>10</td><td>50</td><td>1</td><td>150</td><td>700</td><td>52,50,000</td></tr>
<tr><td>15</td><td>553</td><td>1</td><td>44</td><td>950</td><td>2,31,15,400</td></tr>
<tr><td colspan="5">Total</td><td>2,86,95,400</td></tr>
</table>
</td></tr>
<tr><td>Period of construction</td><td>46 Months</td></tr>
<tr><td>Beneficiary population</td><td>• Local population in 3 fishing villages; Hosdurg, Ajanur and Pallikkara.
• Beneficial for 7,094 people with 2,138 registered fishermen</td></tr>
</table>

2.5 Project Description

The project outlines the construction of a new open sea fishing harbour in Ajanur to address the fisher's infrastructure needs and the challenges posed by the Chithari River's migratory nature. The details of proposed facilities in the are given in Table 2.6.

Table 2.6: Proposed Infrastructure Facilities

S. No.	Component	Details
1.	Northern breakwater	1,150 m
2.	Southern breakwater	425 m
3.	River training wall	435 m
4.	Reclamation bund	400 m
5.	Wharf	120 m × 6.6 m
6.	Auction hall	60 m × 15 m
7.	Approach road	950 m × 5.5 m
8.	Internal road	740 m × 4 m
9.	Parking area	4,320 m^2

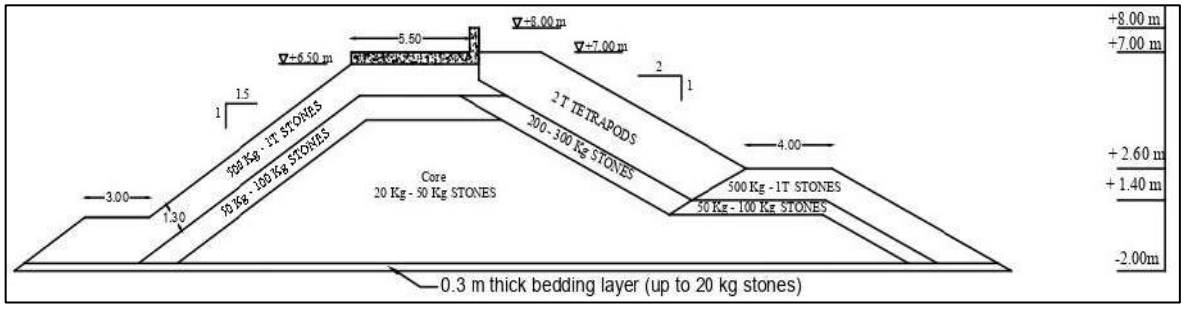
S. No.	Component	Details
10.	Office room cum harbour surveillance camera room	14.6 m × 22.6 m (2 storey)
11.	Work shop building	9.8 m × 9.8 m
12.	Gate House with ATM counter and toll booth	2.4 m × 2.4 m
13.	Wharf for berthing facility	100 m × 5 m
14.	Canteen, Rest Shed, Locker Room, Gear Shed	45 m × 10 m (two storey)
15.	Compound wall	510 m
16.	Side protection work	1,710 m
17.	Toilet Block	13.3 m × 5 m
18.	Net mending shed	23.2 m × 10 m

2.5.1. Proposed Breakwater for the Harbour

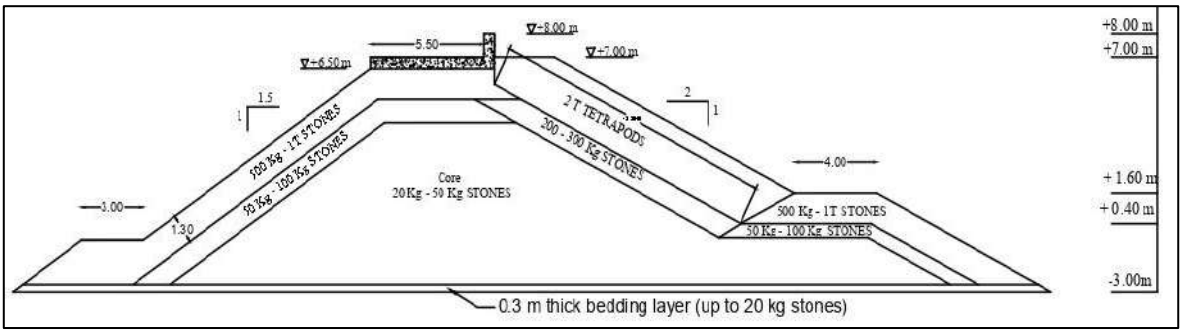
The final layout of the fishing harbour was decided based on the Modelling study report of CWPRS, Pune. The study recommended to construct 2 rubble mound breakwaters of length 1,150 m at the northern side and 425 m at the southern side to from a tranquil basin for the fishing harbour.

Crest width of 6.0 m at trunk and 9.0 m at head will be provided for the breakwaters. 5 kg to 20 kg category stones of approved quality will be used for the filter layer. Core of the breakwater will be constructed using 20 to 50 kg and 20 to 100 kg category stones. Stones of 50 to100 kg, 100 to 200 kg, 200 to 300 kg, 500 kg to 1 T category are proposed for secondary armour. For berm or scour protection stones of 2 to 3 T and 500 kg to 1 T category will be used. Tetrapod of 2 T and 6 T will be provided at sea side trunk portion and 8 T tetrapod will be provided at round head. At the leeward side 500 kg to1 T and 1 T to 2 T category stones are proposed for the primary armour layer. The tip of proposed breakwater lies at - 4.5 m depth of the sea.

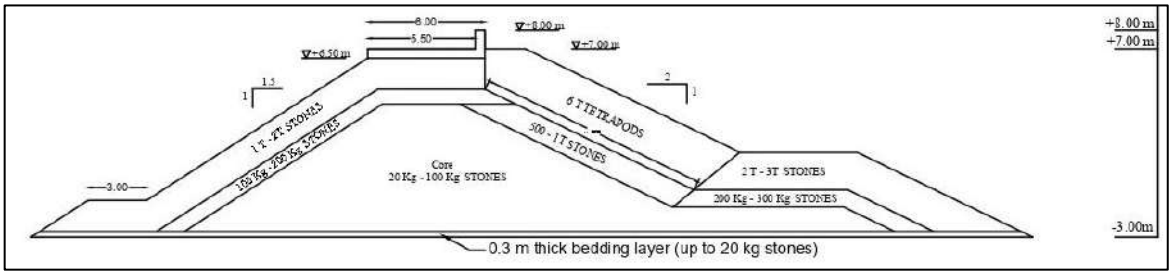
The cross-section details of the breakwater structures are given in Figure 2.5.



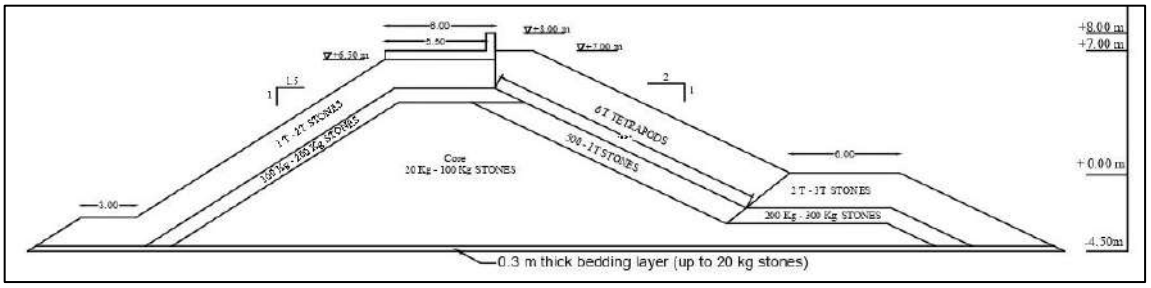
Trunk section at - 2.0 m bed level



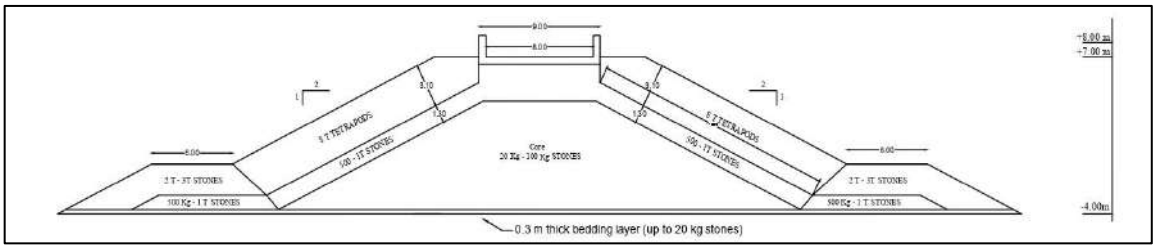
Trunk section at - 3.0 m bed level



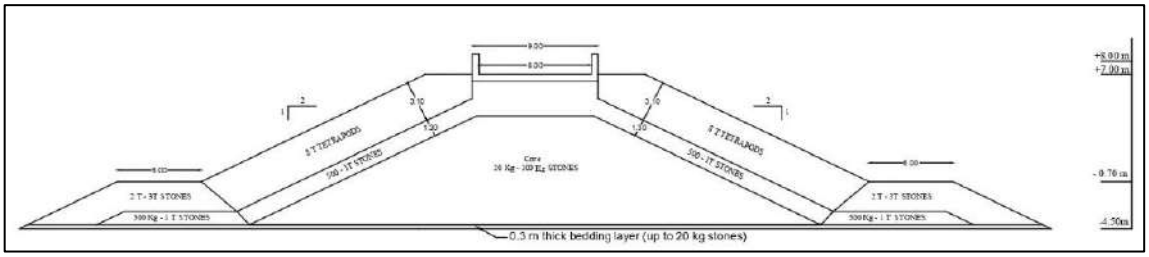
Trunk section at - 3.0 m bed level



Trunk section at – 4.5 m bed level



Round Head section at - 4.0 m bed level



Round Head section at - 4.5 m bed level

Source: DPR

Figure 2.5: Cross section of Breakwater

2.5.2. Proposed River Training Work

River training work of Chithari River in the form of a breakwater of length 435 m is proposed. River training work is proposed considering two major coastal processes: control of shifting and closing of Chithari River mouth due to sedimentation and southward littoral drift and littoral zone consideration. 5 kg to 20 kg category stones of approved quality is proposed for the filter layer. Core of the breakwater is using 20 to 50 kg and 20 – 100 kg category stones are proposed. Stones of 50 -100 kg,100 -200 kg, 200 - 300 kg, 500 kg - 1 T category are proposed for secondary armour, 2 to 3 T and 500 kg - 1 T category stones for berm or scour protection and 2T, 6T tetrapod at sea side at trunk portion and 8T tetrapod at round head is proposed. At the leeward side 500 kg - 1T and 1T - 2T category stones are proposed category stones for the primary armour layer. Crest width of 6.0 m at trunk and 9.0 m at head is provided.

2.5.3. Proposed landside facilities

The details of proposed facilities of the fishing harbour are given in Table 2.7.

Table 2.7: Proposed facilities for the fishing harbour

S. No	Particulars	Details
1.	Reclamation Bund	• Reclamation Bund is proposed along the basin for a length of 400 m. • Geotextile membrane will be laid along the bund (120 g/m^2 membrane) in two layers.
2.	Wharf and Auction Hall	• 120 m long wharf with a width of 6.60 m for 60 m length and 5.00 m width for remaining 60 m length is provided for landing, berthing, and repair of fishing vessels. Auction hall is of size 60 x 15 m is proposed on the rear side of the quay wall along landing area. • Bored cast-in-situ concrete piles of 750 mm diameter and 27.35m length is proposed as foundation for wharf.
3.	Canteen, Rest shed, locker room and gear shed	• Two storied building of size 45 m x 10 m is proposed to accommodate the facilities. • Net mending shed of size 23.2 m x 10 m is proposed in the ground floor. • 5 locker rooms and 5 shop rooms of size 3.10m x 3.50 m size is proposed in the ground floor. • A canteen of size 23.2 m x 10 m is proposed in the first floor along with 10 rest rooms of size 3.10m x 3.40 m. Head room of height 300cm is proposed. • Concrete isolated column footing over coconut piling and rubble packing is proposed as the foundation of structure.
4.	Compound wall & side protection works	• Compound wall with laterite stone of size 30x20x20 cm is proposed. The side protection works with foundation of

S. No	Particulars	Details
		coconut piling work with 30 cm thick and 80 cm wide dry rubble masonry above it. Superstructure of side protection work is proposed in gabion structure with mechanically woven double twisted hexagonal shaped wire mesh gabion boxes along with geo-textile filter between pitching and embankment slopes, to prevent escape of the embankment material through the voids of the stone pitching.
5.	Gate and Gate house	• Gate and gate house are proposed to ensure security to the harbor and to facilitate toll collection. • Toll booth and ATM counter of size 2.4 x 2.4 m each is proposed along with the gate house.
6.	Internal Roads and Parking Area and Drainage Facility	• Two-way internal road of width 4 m will be provided • Parking area of 4,320 m^2 will be provided • Covered drain with concrete PCC bed, side walls and guard stone will be provided
7.	Toilet Block	• Toilet block including 4 water closets, counter room cum cloak room, courtyard, bath area and wash area will be provided
8.	Approach Road	• Construction of approach road over a length of 950 m with 5.50 m width is proposed. • Proposed road connects Kanhangad Kadappuram road junction and proposed harbor. • The existing road is partially damaged with 4 m width.
9.	Work shop building	• Two storied building with 9.8 m x 9.8 m is proposed for work shop building. • The building contains office room (1.75 x 3m), shop (3 x 3m), toilet (1.05 x 1.2m), an electrical workshop (3 x 3m), a mechanical workshop (3 x 3m), a crane facility and a workspace (3 x 9.4m).
10.	Construction of office room cum harbour surveillance camera room	• A two storied building is proposed for office and Harbor surveillance camera room having a plinth area of 299.2 m^2. • Ground floor includes office room, store room, rest room, 3 toilet, porch, entrance, stair room, and an open area for cabins. • First floor contains an additional store room.
11.	Overhead and sump tank	• Overhead RCC water tank and sump of capacity 100 kL is proposed • A pump house will be constructed at the bottom of RCC tank • RCC sump of 50 kL capacity is proposed

S. No	Particulars	Details
12.	Electrification and Installation of Solar energy system	Proposed to set up facilities for electrification and installation of solar energy system.
13.	Berthing wharf	Berthing wharf of length 100 m and width 5m is proposed to be constructed near the south breakwater.
14.	ETP, Navigational Aid, Pressure Washer and Cleaning Equipment, Landscaping, Green Belt and Rainwater Harvesting, Mechanical conveyor system & Automation	• Mechanical conveyor system & Automation, ETP, Rainwater harvesting, pressure washer and cleaning, and navigational aid proposed. • Green area of 3,000 m^2 is proposed and it will be provided as a green belt of thickness 5 m.

Source: DPR

2.5.4. Proposed Dredging activities in the harbour

Dredging is proposed in the basin channel having average width 130 m and length 510 m. Dredging is also proposed in between the north breakwater and river training work at the mouth of River Chithari on an average 100 m width and 350 m length. It is proposed to dredge the area to a level of -3.0m. The total quantity of dredging proposed is 1,32,500 m^3. About 50% of the dredged spoil will be reused to the construction of the reclamation bund.

2.5.5. Proposed Smart Infrastructures in the Harbour

Smart infrastructure is proposed in the Ajanur Fishing Harbour using advanced technologies to improve efficiency, safety, and transparency in operations. Key features include:

- Digital Information Dissemination - Setting up a website and digital platforms to share information on auctions, harbour services, and fishery details, ensuring transparency and accessibility.
- Electronic Auctions - Implementation of local and online electronic auctions for efficient and fair trade, enabling global buyer participation without physical presence.
- Automated Sorting and Grading Systems - Use of machines to sort and grade fish by species, size, and quality, reducing manual effort and improving accuracy.
- Electronic Records for Sales and Resource Management - Maintaining digital records of catches, sales, and traceability to ensure efficient management and compliance with regulatory requirements.
- Hygiene and Safety Management - Introduction of automated entry/exit systems for vehicles and personnel, with hygiene checks integrated, to maintain safety and cleanliness standards.
- CCTV and Surveillance Systems - Installation of cameras for real-time monitoring of harbour activities, enhancing operational safety and security.
- Weighing and Cataloguing Systems - Advanced terminals and RFID-tagged systems for accurate weighing and easy creation of detailed sales catalogues.

- Hazard Analysis Critical Control Points (HACCP) System Integration - Facilitating electronic recording and monitoring of hygiene compliance at critical control points to uphold food safety standards.
- Traceability Enhancement - Digital traceability from catch to consumer through labels, QR codes, and electronic documentation for ensuring sustainability and quality assurance.

2.6 Technology and Process Description

The structure opted for the river training works and formation of tranquil river basin are rubble mounded breakwaters with tetrapod. Granite stones of size 10 kg to 3T and tetrapod of 2T, 6T and 8T will be used for the construction of the breakwaters. The alignment of the breakwater structures was finalized based on the recommendations of the model study by CWPRS.

RCC structures with strong foundation will be provided for the proposed harbour facilities at shores. Concrete beams, slabs and pillars will be made with optimized design considering the environmental conditions of the project area.

2.6.1. Feasibility Drawing

The schematic representations of the feasibility drawings which give information important for EIA purpose is given in Figure 2.6.

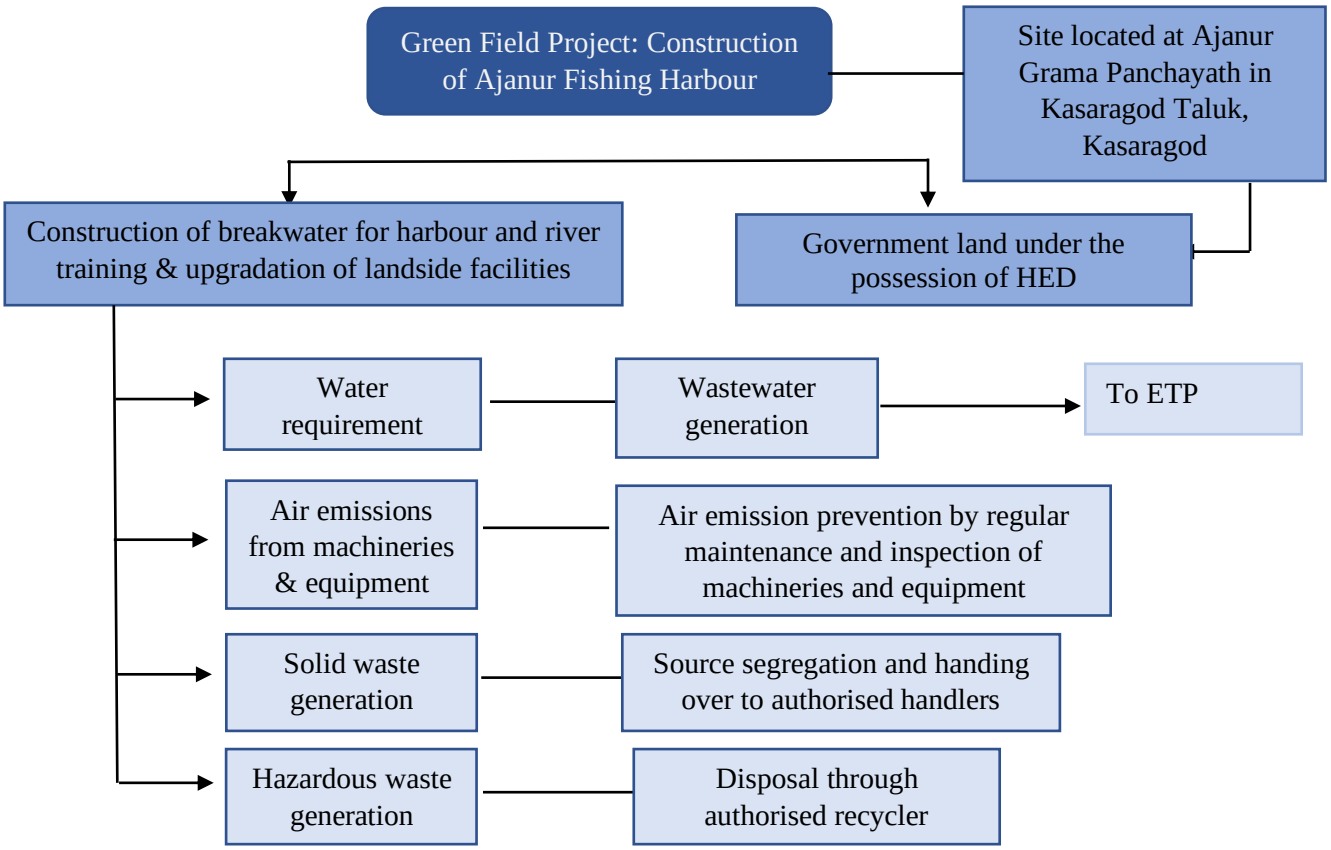


Figure 2.6:Feasibility Drawing

2.7 Resource Requirement for the Project

2.7.1. Land requirement

The proposed project will be constructed in the government Puramboke land available next to the existing FLC. No land acquisition and therefore no Rehabilitation and Resettlement (R&R) is required for the project. Also, no trees are proposed to be cut for the proposed constructions.

2.7.2. Water Requirement

The water requirement during the construction activities is 6.5 kLD; 2 kLD for construction activities and 4.5 kLD for construction workers (2.5 kLD for domestic purposes and 2 kLD for flushing requirements). The water will be sourced from a nearby pump house and an open well outside the CRZ area.

During the operation phase, the total water requirement is 16 kLD, which will be used for handling area washing and for worker demands. A detailed water balance chart for the proposed project is given in Figure 2.7.

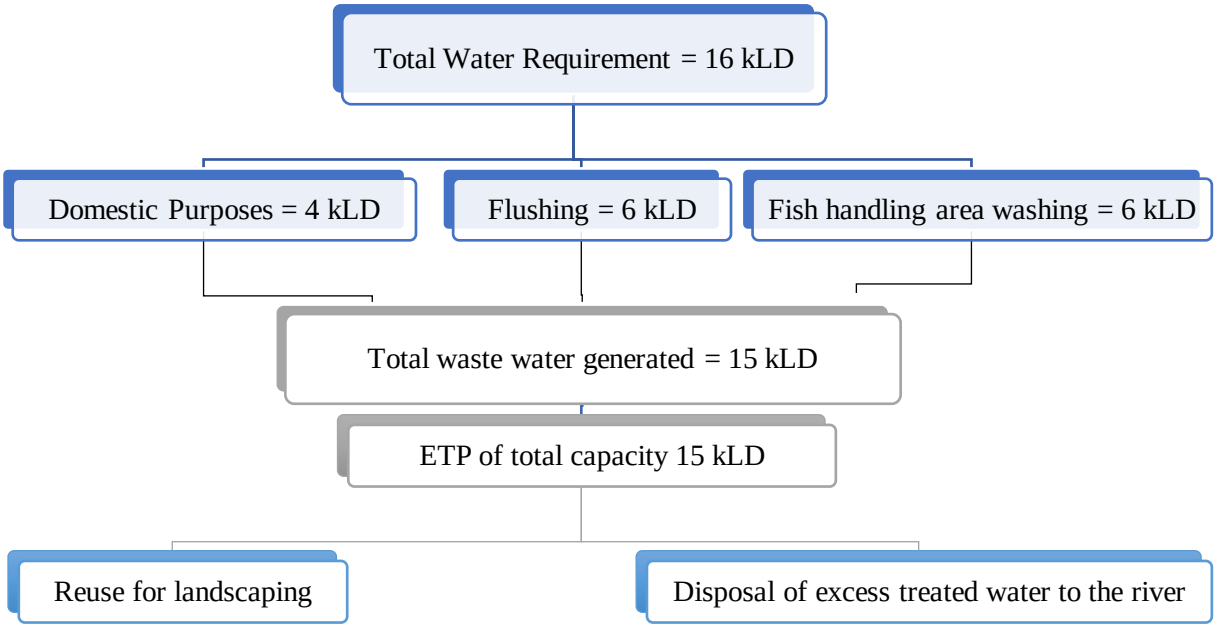


Figure 2.7: Water Balance Chart for the operational phase of the Proposed Project

The total water requirement for the project is 16 kLD, which will be sourced from the nearby pump house and open well. Additional water, if required, will be bought in tankers. The environmental impact of fresh water requirement is measured by a blue water footprint of 4847 kL per annum, considering fishing days equivalent to 10 months will be available for the fishing activities and operations of the harbour after achieving the safe fishing conditions.

2.7.2.1. Harvested Rainwater

It is proposed to provide Rainwater Harvesting tank of capacity 50 kL. The harvested water will be used as a source of fresh water at the harbour after filtration and disinfection. This will in-turn reduce the water footprint of the project.

2.7.3. Power Requirement

The power requirement for the construction phase will be 5 kVA, for which a temporary connection from Kerala State Electricity Board (KSEB) will be obtained. During the operation phase, all electrical installations in the harbour will be powered from solar energy. Solar panels of capacity 30 KW will be installed, which will satisfy the power requirement of 30 KW in operational phase. 1 DG set of capacity 30 kVA will be used as source of backup power for emergency situation.

2.7.4. Workforce Requirement

The workforce required for the proposed construction activities are estimated to be 100 workers/day as direct employees. The project will also provide indirect employment to about 200 workers/ day. The workforce requirement will be met as far as possible from the local population, depending on their skillset and knowledge. During the operation phase, about 15 workers will be employed at the harbour facilities.

2.7.5. Transport Infrastructure

The project sites for the construction of the fishing harbour. The nearest National Highway (NH) is NH–66, which is at a road distance of about 6.5 km (E). The nearest State Highway (SH) is SH–57 which is 2.9 km away from the site.

During the construction phase, about 40 trucks are expected per day to bring construction materials to the site. During the operation phase, for the smooth management of the vehicles carrying workers to the harbour and trucks transporting the catch from the harbour, adequate internal roads will be provided. A 4 m two-way internal road system is proposed to accommodate various type of vehicle entering and leaving the fishery harbour. An area of 4,320 m^2 is proposed for parking. About 80 trucks are anticipated per day into the harbour to transport the daily catch to nearby markets and consumers.

2.8 Aspects of the Project Likely to Cause Environmental Impact

The requirement of huge quantities of granite stones and tetrapod for the construction along with the conveyance and unloading of these materials at the site are the major environmental impacts anticipated due to the project. It shall be made sure that the quarry sourcing the granites stones and aggregates for the tetrapod possess valid EC and all other statutory clearances.

During the operation phase of the project, the increased fish landing days and increased fish landing capacity will lead to higher requirement of natural resources like fresh water and need for proper management of the waste generating from the site.

2.9 Management of wastes and emissions for the Project

2.9.1. Wastewater Management

Wastewater estimated to be generated by the construction workers is about 4 kLD. During the operation phase, the wastewater estimated to be generated from the operations of the harbour is about 15 kLD and for the management of wastewater generated from the harbour facilities, ETP of 15 kLD is proposed.

2.9.2. Storm Water Management

Storm water drain network is proposed for the project. Drains of length 364 m will be laid around the proposed parking area, having a depth of 0.6 m. Drains of length 57 m having a depth of 1 m will be provided to direct the storm runoff into the river. The width of the drains will be 1 m. The drains will have concrete Plain Cement Concrete (PCC) bed, side walls, cover slabs and 5 cm thick levelling course. Guard stone of 0.15 m height is proposed on the side of drainage.

2.9.3. Solid and Hazardous Waste Management

During the construction phase, the total solid waste generated by the construction workers is estimated to be 10 kg/ day, out of which, 4 kg/day will be biodegradable waste and 6 kg/day will be non-biodegradable waste.

The dredged spoil remaining after reusing it for construction of the reclamation bund will be disposed beyond 3 km and up to 5 km into deep sea.

The solid waste generated by the operation staff is estimated to be about 0.5 kg/day as biodegradable waste and 1 kg/day as non-biodegradable waste.

2.9.4. Management of Air Quality

For preventing dust emissions from the increased movement of vehicles into the harbour, it is proposed to redevelop the access road, provide adequate internal roads and parking areas at the harbour.

2.9.5. Management of Noise Levels and Vibrations

Adequate parking facilities are proposed at the project site to avoid on-road parking, which otherwise would have resulted in increased honking at the site premises.

2.10 Assessment of New & Untested Technology

The layout for constructing open sea fishery harbour and river training work was derived by CWPRS, Pune using latest site-specific data. Following studies were carried out by CWPRS to ensure the efficiency and suitability of the proposed layout to overcome the existing challenges faced by the fishers:

- Littoral drift distribution estimated using LITDRIFT model and modeling was done for shoreline evolution studies.
- The 2-dimensional hydrodynamic model MIKE-21 HD, using flexible mesh used for simulating the flow field.
- Sediment transport studies using MIKE-21 MT in existing and the proposed scenario under prevailing tidal and wave conditions.
- Desk and wave flume studies for the design of breakwater.

2.11 Proposed Schedule for Approval and Implementation

The construction of proposed fishing harbour will commence after obtaining CRZ clearance from SEIAA, Kerala and other statutory approvals/ NOCs required. A period of 48 months is estimated for these construction activities.

2.12 Project Cost

The estimated project cost for the development of the proposed fishing harbour is INR 20,000 Lakhs. The project will be funded in accordance with the Pradhan Mantri Matsya Sampada Yojana (PMMSY) and the funding will be shared by the Central and the State government in the ratio 60:40.

Chapter 3 Description of the Environment

The study area for conducting the EIA studies for the collection of primary baseline data & secondary data for environmental sensitivity is the area surrounding 10.0 km of the project site. Classification of the study area is given in Table 3.1.

Table 3.1: Classification of Study Area

S No.	Study area	Type of Baseline data collection	Attributes
1.	Area within 2.0 km from project site	Primary	Ambient air, noise levels, marine water, marine sediments, surface water, soil, details of flora & fauna
2.	Area outside 2.0 km of the project boundary up to 10.0 km surrounding the project site	Primary & Secondary data from various reliable sources	Ambient air, noise levels, marine water, marine sediments, surface water, soil, Meteorological data, surface water bodies, Flora, Fauna, Socio economic aspects, land use/ land cover (LULC)

The study areas are marked in the Toposheet is given in Figure 3.1.



Source: Survey of India

Figure 3.1: Toposheet of 10 km Study Area

The study area falls in Survey of India (SOI) Topographical Sheets (1:50,000 scale) OSM No. 48P/3, and 48P/4. As per toposheet the project site is located near water body with native vegetation with scattered built-up areas.

3.1 Study Period

Baseline study for the project was conducted for assessing existing environmental status of the area. Primary data and secondary data are collected from 10.0 km study area during study period i.e., from 19.12.2022 to 14.03.2023.

3.1.1 Generation of Baseline Data

Baseline information with respect to air quality, noise level, water quality, soil quality, sediment quality, biological environment and socio-economic environment in the study area were collected through primary sampling and field studies during the study period. The baseline environmental monitoring reports are attached as Annexure 1 of this EIA report.

3.2 Reconnaissance Survey and Ground Truth verification

Reconnaissance survey has been conducted by the EIA consultant for ground truth verification. The photograph of the reconnaissance survey is shown in Figure 3.2.

The field observations are used to:

- Observe the baseline environmental status of study area.
- Identify extent of negative impacts on community/ natural resources.
- Identify mitigation measures and monitoring requirements.



Figure 3.2: Photograph of Reconnaissance Survey Team

3.3 Valued Environmental Components (VEC)

The Valued Environmental Components is shown in Figure 3.3.

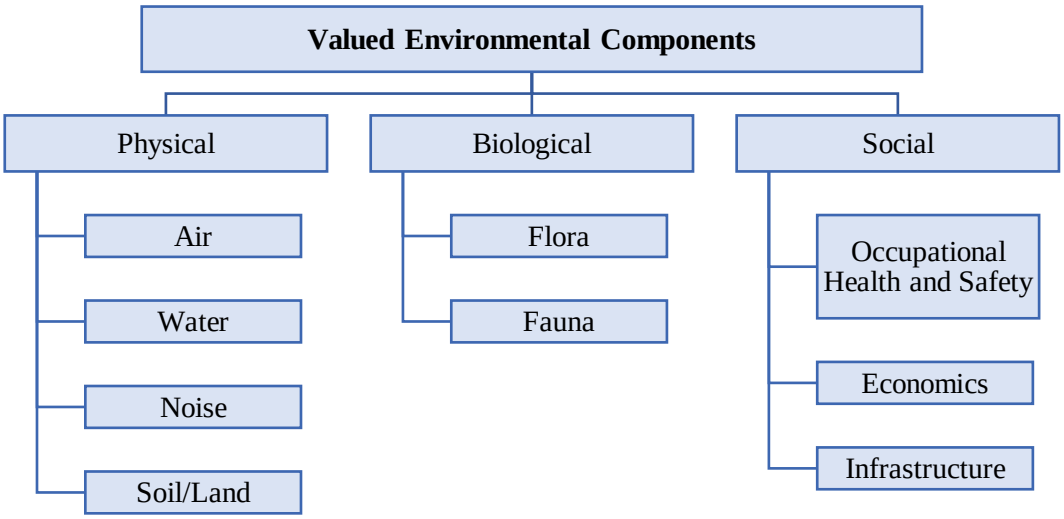


Figure 3.3: VEC

3.4 Sampling Plan

The sampling locations for the baseline monitoring of environmental attributes were identified based on the observations from reconnaissance survey and the following:

- Predominant wind directions in the study area
- Existing topography, drainage pattern and locations of water bodies
- Location of villages/towns/sensitive areas

The sampling plan finalized for environmental baseline monitoring is depicted in Table 3.2.

Table 3.2: Sampling Plan for Environmental Baseline Monitoring

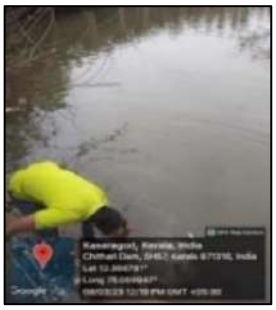
S No	Attribute	Parameters	Frequency of monitoring	No. of locations
1.	Ambient Air Quality	PM_{10}, $PM_{2.5}$, SO_2, NO_2 & CO	24 hourly continuous monitoring (Twice in a week for 12 weeks)	3
2.	Ambient Noise Quality	Leq, Lday, Lnight	Day - 6 AM to 10 PM & Night -10 PM to 6AM (24 hourly continuous monitoring, once during the study period)	3
3.	Surface Water Quality	pH, Colour, Odour, Turbidity, Total Hardness, Iron, Chloride, Fluoride, Total Dissolved Solids, Sulphate, Total Alkalinity, Nitrate, *E.coli*, Total coliform bacteria, Phytoplankton, Zooplankton	Once during the study period	1
4.	Soil	pH, Conductivity, Water Holding Capacity, Organic Matter, Sulphur, Total Phosphorus, Sodium, Potassium, Particle Size distribution, Chloride, Total Kjeldhal Nitrogen, Phosphate.		1
5.	Marine Water Quality	pH, Colour, Odour, Turbidity, Total Hardness, Iron, Chloride, Fluoride, Total Dissolved Solids, Sulphate, Total Alkalinity, Nitrate, Conductivity Calcium, Magnesium, Sodium, Potassium, Mercury, Lead, Copper, Zinc, Cadmium, Total Suspended Solids, Biochemical Oxygen Demand, Chemical Oxygen Demand, Dissolved Oxygen, Oil & Grease, Salinity,		2

S No	Attribute	Parameters	Frequency of monitoring	No. of locations
		Temperature, Phosphate, *E.coli*, Faecal coliforms, Phytoplankton, Zooplankton		
6.	Marine Sediments	pH, Texture – Sand, Silt & Clay, Organic Matter, Total Phosphorus, Aluminium, Iron, Lead, Manganese, Zinc, Copper, Mercury, Cadmium, Total Kjeldhal Nitrogen, Benthos		2
7.	Meteorology	Wind speed, Wind direction, Temperature, Rainfall, Humidity	NASA POWER Data	

The samples for the primary data generation were analyzed by NABL accredited laboratory engaged by ULTRA TECH. Environmental baseline monitoring photographs are depicted in Figure 3.4.



Noise Level



Surface Water

Figure 3.4: Baseline Monitoring Photographs

3.5 Land Environment

The status of land environment has been assessed through reconnaissance survey at the project site, characterization of soil through field studies and monitoring and through the study of Land Use Land Cover (LULC) using geo-processing software.

3.5.1 Land Use Land Cover

The LULC of the study area i.e., covering aerial distance of 2.0 km and 10.0 km has been prepared using geo-processing software QGIS supported with ground truth verification. Area and distance calculations have been carried out using the software after geo-referencing the interpreted data with the help of the topographical maps and Google Earth Imagery. Details of the data used for LULC is given in Table 3.3.

Table 3.3: Details of satellite image data used for land use classification

Spacecraft Platform & Agency	:	Landsat 08 of NASA and the U.S. Geological Survey (USGS)
Satellite Sensor	:	Multi-spectral Instrument
Sensor ID	:	OLI_TIRS
Entity ID	:	LC08_L2SP_145052_20230227_20230301_02_T1
Acquisition date	:	27.02.2023

Processing Level	:	L2SP
Spatial Resolution	:	30 m

Source: USGS Earth Explorer

Standard False Colour Composite (FCC) Map of satellite image and LULC map of 2 km area of the project is given in Figure 3.5 and Figure 3.6 respectively.

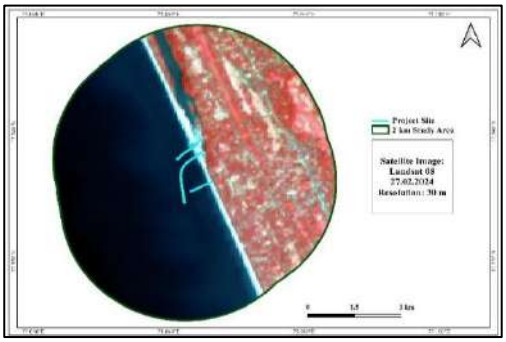


Figure 3.5: Standard FCC Map of Satellite data of 2 km Area

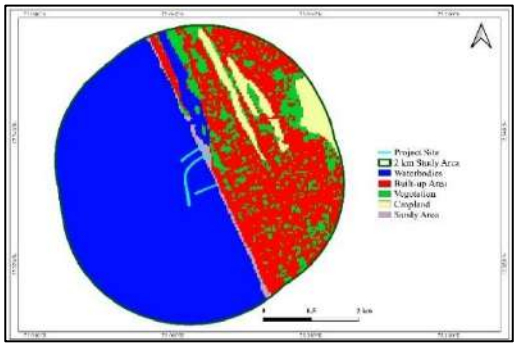


Figure 3.6: LULC of 2 km Area

The statistics of LULC obtained are given in Table 3.4.

Table 3.4: Land use/ Land cover Statistics of Area within 2 km Radius

LULC Classes	Area (in ha)	Area (in %)
Waterbodies	1,019.6	57.17
Built-up area	474.6	26.61
Vegetation	179.5	10.06
Cropland	87.2	4.89
Sandy Area	22.7	1.27
Total	***1,783.53***	***100.00***

Waterbody is prominent in 2 km study area occupying more than half of the land cover, which is further followed by built-up area and vegetation. Cropland is visible in the study area.

Standard False Colour Composite (FCC) Map of satellite image and LULC map of 10 km study area of the project is given in Figure 3.7 and Figure 3.8 respectively.

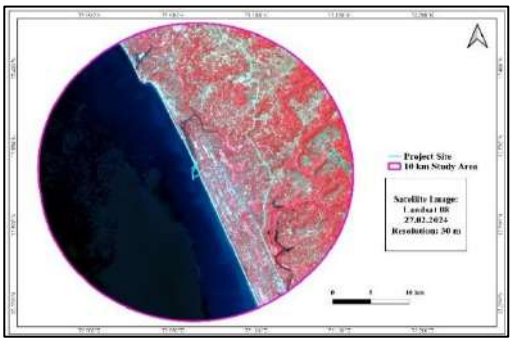


Figure 3.7 : Standard FCC Map of Satellite data of 10 km Study Area

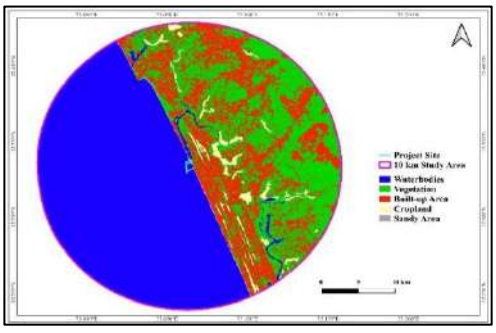


Figure 3.8: LULC of 10 km Study Area

The statistics of LULC obtained are given in Table 3.5.

Table 3.5: Land use/ Land cover Statistics of Area within 10 km Radius

LULC Classes	Area (in ha)	Area (in %)
Waterbodies	17,218.8	50.73%
Vegetation	9,034.0	26.62%
Built-up Area	6,886.5	20.29%
Cropland	694.5	2.05%
Sandy Area	107.6	0.32%
Total	**33,941.52**	**100.00%**

Similar to the LULC map for 2 km study area, more than half of the 10 km study area comprises of waterbodies, with the sea as prominent feature followed by inland water bodies. Vegetation is prominent followed by Built-up area. Cropland consist of paddy fields and other agricultural land which is prominent when compared to sandy area which is on the coastal strip of the sea.

3.5.2 Topography

The elevation of 10 km study area was prepared using Digital Elevation Model (DEM), which is a digital tool or a 3D representation of terrain's surface. The map showing DEM and topographic contour (20.0 m interval) of 2 km study area is shown in Figure 3.9 and that of 10 km study area is show in Figure 3.10. Highest elevation is 185 m AMSL and lowest elevation is -7 m AMSL for 10 km area.

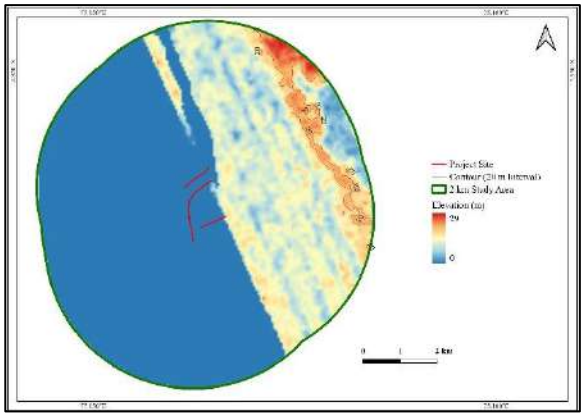


Figure 3.9: DEM of 2 km Area

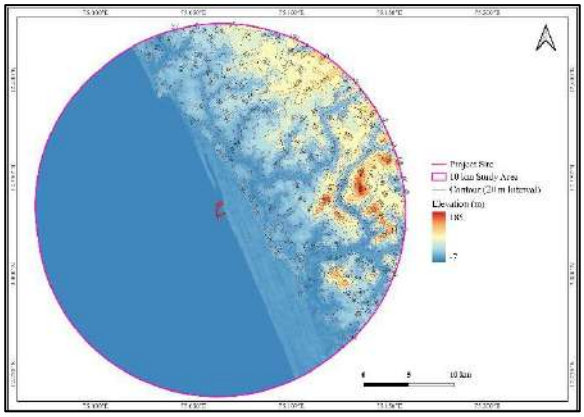


Figure 3.10: DEM of 2 km Area

A slope map provides the colorized representation of slope of an area in degrees. The map showing the slope of 2 km and 10 km study area is shown in Figure 3.11 and Figure 3.12 respectively.

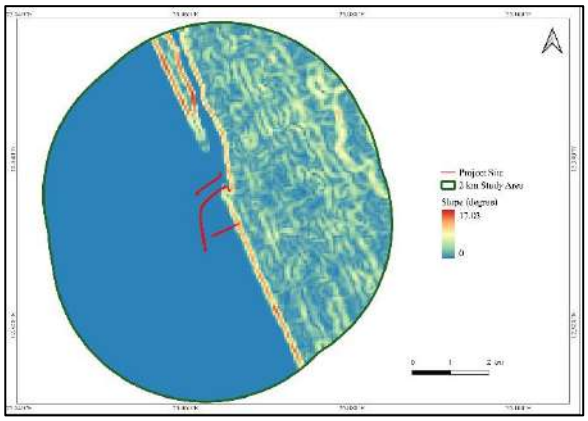


Figure 3.11: Slope Map of 2 km Area

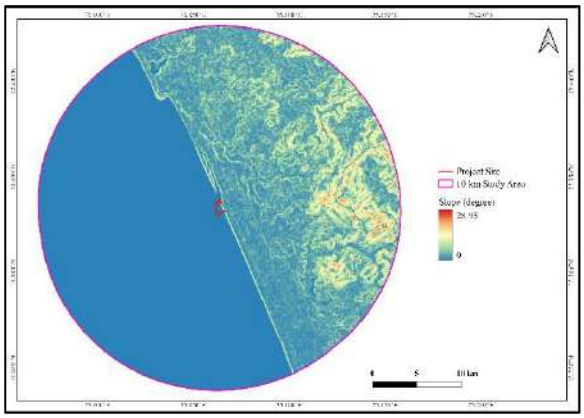


Figure 3.12: Slope Map of 10 km Area

The slope ranged from 0 to 29° in 10 km study area. The aspect map which represents the direction of slope in 2 km study area and 10 km study area is shown in Figure 3.13 and Figure 3.14 respectively.

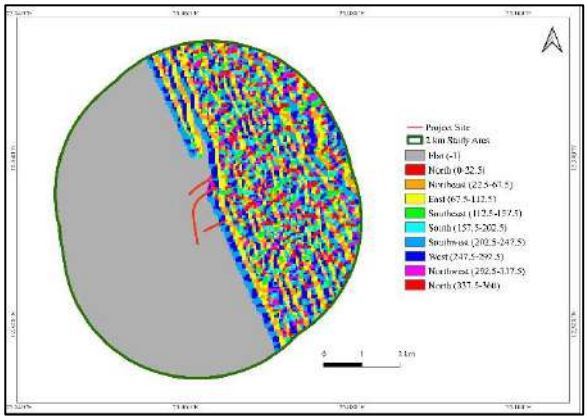


Figure 3.13: Aspect Map of 2 km Area

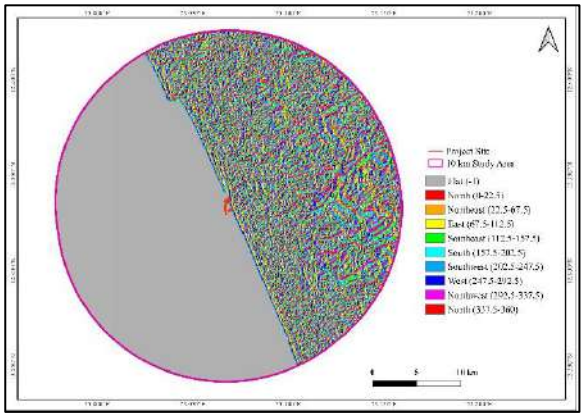


Figure 3.14: Aspect Map of 10 km Area

3.5.3 Soil Quality

Soil is the most important medium for supporting agricultural development. Its properties influence fertility, water retention capacity, physical support capacity of plant roots, and determination of various other chemical constituent parameters. It is thus a vital necessity to study the nutrient status of soil regime.

Methodology for Soil Sampling

- Materials required

Materials required for soil sampling includes spade or auger (screw or tube or post hole type), Khurpi trowel, sampling bags and plastic tray/ bucket.

- Procedure:
  - Divide the field into different homogenous units based on the visual observation.
  - Remove the surface litter at the sampling spot & plough a depth of 5 cm for taking sample.
  - Drive the auger to a plough depth of 15 cm and draw the soil sample.
  - Collect at least 8 to 9 samples from each sampling unit and place in a bucket or tray.

- If auger is not available, make "V" shaped cut to a depth of 15 cm in sampling spot using spade.
- Remove thick slices of soil from top to bottom of exposed face of the "V" shaped cut and place in a clean container.
- Mix samples thoroughly and remove foreign materials like roots, stones, pebbles and gravels.
- Reduce the bulk to about half to 1 kg by quartering or compartmentalization.
- Quartering is done by dividing the thoroughly mixed sample into four equal parts. The two opposite quarters are discarded and the remaining two quarters are remixed and the process repeated until the desired sample size is obtained.
- Compartmentalization is done by uniformly spreading the soil over a clean hard surface and dividing into smaller compartments by drawing lines along and across the length and breadth. From each compartment a pinch of soil is collected. This process is repeated till the desired quantity of sample is obtained.
- Collect the sample in a clean cloth or polythene bag. (Details are given in UT /LQMS/SOP/S00)
- Label the bag with information like location of sampling along with date and time of sampling and name of the sampler etc.

Soil Sampling Locations

Soil conditions near the project site were analysed for their physical & chemical characteristic. Approximately 1 kg of soil sample was collected from the selected location to determine the physico-chemical parameters. Representative soil samples were taken from a depth of 0-15 cm to estimate the soil quality. Soil sample was collected from the project site during the month of March 2023, and the details of sampling location is given in Table 3.6.

Table 3.6: Soil Quality Monitoring Location

S. No.	Location Code	Location Name/ Landmark	Distance (km)	Direction	Selection Criteria	Latitude & Longitude
1.	SQ1	On proposed FLC	-	-	Source of pollution (Non-Agricultural Land)	12°20' 10.06" N 75°3'54.92" E

The soil sampling locations are shown in Figure 3.15.



Figure 3.15: Soil Quality Monitoring Location

Results and Observations

The results of the quality analysis performed of at the identified location are given in Table 3.7.

Table 3.7: Soil Quality Analysis Results

S. No	Parameter	Unit	Result of Analysis
1.	pH	--	6.6
2.	Conductivity	µS/cm	282
3.	Water Holding Capacity	%	52
4.	Organic Matter	%	0.23
5.	Sulphur	mg/kg	207.75
6.	Total Phosphorus	mg/kg	23.35
7.	Sodium	mg/kg	159.72
8.	Potassium	mg/kg	208.54
9.	Particle Size distribution (Dry weight basis) a) Above 2.36 mm b) 2.36-1.18 mm c) 1.18 mm-600 microns d) 600-425 microns e) 425-300 microns f) 300-150 microns g) 150-75 microns h) Below 75 microns	%	 12.34 13.28 14.03 11.53 18.20 19.48 6.22 4.92
10.	Chloride (Water extractable)	mg/kg	242.18
11.	Total Kjeldhal Nitrogen	%	771.57
12.	Phosphate	mg/kg	55.60

The standard soil classification is given in Table 3.8.

Table 3.8: Standard Soil Classification

S. No.	Soil test	Classification-Fertility Status
1.	pH	< 4.4 Extremely acidic 4.41- 5.00 very strongly acidic 5.01-6.00 moderately acidic 6.11- 6.40 slightly acidic 6.31-7.30 Neutral 7.21- 7.70 moderately alkaline 8.31-9.0 strongly alkaline > 9.01 very strongly
2.	Salinity Electrical Conductivity µS/cm 1ppm = 640 µS/cm	Up to 1.00 Average 1.1– 1.98 harmful to germination 2.01-3.00 harmful to crops (sensitive to salts)

S. No.	Soil test	Classification-Fertility Status
3.	Organic Carbon (%)	<0.5 Poor Soil 0.5-0.75 Medium Fertile Soil >0.75 Fertile Soil
4.	Phosphorus (kg/ha)	<10 Poor Soil 10-25 Medium Fertile Soil >57 Fertile Soil
5.	Potassium (kg/ha)	<108 - Poor Soil 108-280 -Medium Fertile Soil >280 -Fertile Soil

Source: Soil Survey Manual by IARI (Indian Agricultural Research Institute)

Analysis of Soil Quality Results:

The collected soil samples were analysed for various parameters. pH is an important parameter indicating alkaline and acidic nature of soil. It severally affects the microbial population as well as the solubility of metal ions that regulates nutrient availability. The pH of the soil in the study area is close to neutral. The soluble salts were determined from soil extract (1:2). The soluble salts are expressed in terms of electrical conductivity. The Electrical Conductivity of the soil extract in the study area is 282 µS/cm.

Organic matter present in the soil influences its physical and chemical properties. It commonly accounts as one third or more of the cation exchange capacity of surface soil and is also responsible for stability of soil aggregates. Analysis shows that the concentration of organic matter is 0.23 %. It was observed that fertility of the soil sample is poor in terms of organic matter.

Interpretation

The soil in the study area is characterized as sparsely acidic pH. However, the organic matter content is low, suggesting a need for organic amendments to improve soil fertility and water-holding capacity. The electrical conductivity indicates a high level of salinity.

3.6 Water Environment

3.6.1 Hydrogeology

Groundwater is present in the fractured crystalline aquifer under semi-confined to restricted conditions.

3.6.2 Drainage

The area features network of sea, rivers, canals and lakes, with dendritic drainage pattern. Arabian sea, Chithari River etc. are part of the project area. Drainage map of 2 km study area is shown in Figure 3.16 and drainage map of 10 km study area is given in Figure 3.17.

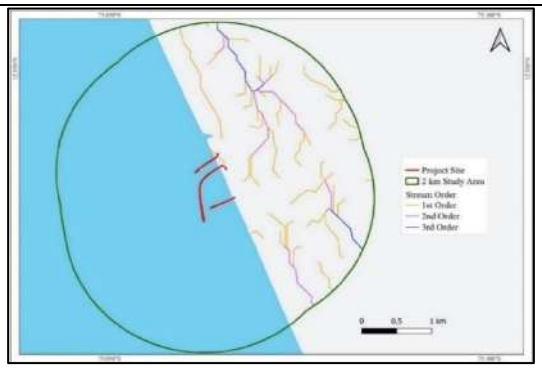


Figure 3.16: Drainage Map of 2 km Area

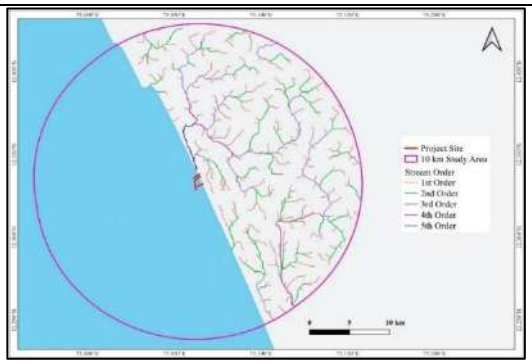


Figure 3.17: Drainage Map of 10 km Study Area

From the drainage maps, it is learned that the study area features dendritic drainage pattern of sea, rivers, canals and lakes.

3.6.3 Surface Water Quality

Sample from was collected from 1 location for surface water quality. Details of the monitoring location are given in Table 3.9.

Table 3.9: Surface Water Monitoring Locations

S. No	Location Code	Location Name /Landmark	Direction	Distance (km)	Selection Criteria	Latitude & Longitude
1.	SW1	Chithari River	NW	3.35 from Northern Breakwater	Chithari River	12°21' 58.5" N 75°3'30.06" E

The surface water quality monitoring locations shown in Figure 3.18.

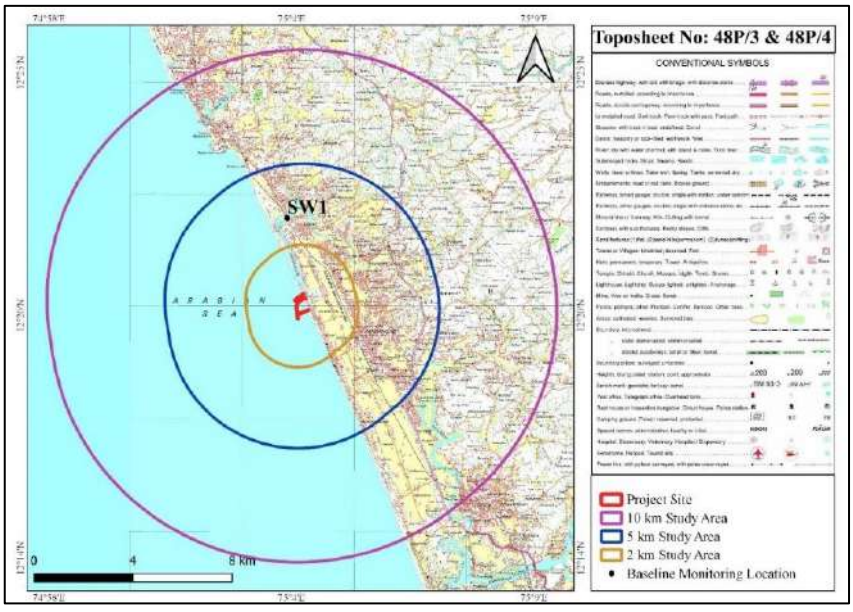


Figure 3.18: Surface Water Monitoring Locations

3.6.3.1. Results and Observations

The results of the surface water quality parameters tested to analyze the characteristics of the water samples are given in Table 3.10.

Table 3.10: Surface Water Quality Analysis Results

S. No	Test Parameter	Unit	Results (SW1)
1.	pH at 25^0C	---	7.5
2.	Colour	Hazen Units	4.0
3.	Odour	---	Agreeable
4.	Turbidity	NTU	0.80
5.	Total Hardness as $CaCO_3$	mg/l	8160
6.	Iron as Fe	mg/l	0.22
7.	Chloride as Cl	mg/l	18345.38
8.	Fluoride as F	mg/l	BDL(MDL-0.2)
9.	Total Dissolved Solids	mg/l	38090
10.	Sulphate as SO_4	mg/l	3324.38
11.	Total Alkalinity as $CaCO_3$	mg/l	133.25
12.	Nitrate as NO_3	mg/l	1.42
13.	*E.coli* or thermotolerant coliform bacteria	MPN/100 ml	<2
14.	Total coliform bacteria	MPN /100 ml	<2
15.	Phytoplankton	cells/ml	40
16.	Zooplankton	cells/ml	20

** BDL: Below Detection Limit*
**MPN: Most Probable Number*
**NTU: Nephelometric Turbidity Unit*

The results show a range of values for various parameters monitored. The pH of surface sample is 7.5, within the typical range for surface water and favourable for aquatic life. The turbidity of 0.80 NTU is relatively low, suggesting clear water with minimal suspended particles. The total hardness of 8,160 mg/L as $CaCO_3$ is high. The chloride concentration of 18,345.38 mg/L and total dissolved solids of 38,090 mg/L is very high, which could make the water salty and unsuitable for drinking. The higher chloride content might be due to the proximity to sea. Sulphate concentration of 3,324.38 mg/L is high, which can contribute to the water's salty taste.

3.6.3.2. Interpretation

The water has a low colour intensity and an agreeable odour, indicating minimal organic pollution. However, Total Dissolved Solids, Total Hardness, Chloride, Sulphate values are slightly higher. The presence of phytoplankton and zooplankton indicates a healthy aquatic ecosystem.

3.6.4 Marine Water and Marine Sediment Quality

Marine water and sediment samples were taken from 2 locations for the analysis of selected parameters. Details of monitoring locations taken for sampling are given in Table 3.11.

Table 3.11: Marine Water & Marine Sediment Quality Monitoring Locations

S. No	Location Code	Location Name	Direction	Distance (km)	Selection Criteria	Latitude & Longitude
1.	MW1 & MS1	Muttumthala Beach	NW	0.25, Northern breakwaters	Source of pollution	12°20'16.65"N 75°3'46.00" E
2.	MW2 & MS2	Proposed breakwater	SW	0.1, Southern Breakwaters	Source of pollution	12°19'53.43" N 75°3'58.21" E

Monitoring locations for sampling is shown in Figure 3.19



Figure 3.19: Marine water and Sediment Monitoring Locations

3.6.4.1. Results and Observations of the Marine Water Quality

The results of the marine water quality parameters are given in Table 3.12.

Table 3.12: Marine water Quality Analysis Results

S. No	Test Parameter	Unit	Results	
			MW1	MW2
1.	pH at 25^0C	---	7.4	7.4
2.	Colour	Hazen Units	4.0	4.0
3.	Odour	---	Agreeable	Agreeable
4.	Turbidity	NTU	3.80	6.90
5.	Total Hardness as $CaCO_3$	mg/l	7140	8670
6.	Iron as Fe	mg/l	0.46	0.16
7.	Chloride as Cl	mg/l	19568.40	18345.38
8.	Fluoride as F	mg/l	BDL(MDL-0.2)	

9.	Total Dissolved Solids (TDS)	mg/l	38286	37380
10.	Sulphate as SO_4	mg/l	2030.02	2402.50
11.	Total Alkalinity as $CaCO_3$	mg/l	102.50	102.50
12.	Nitrate as NO_3	mg/l	0.34	0.49
13.	Conductivity	µS/cm	63810	62300
14.	Calcium as Ca	mg/l	490.58	613.22
15.	Magnesium as Mg	mg/l	1440.55	1738.59
16.	Sodium as Na	mg/l	10698.14	10012.50
17.	Potassium as K	mg/l	58.62	64.26
18.	Mercury as Hg	mg/l	BDL(MDL-0.0005)	
19.	Lead as Pb	mg/l	BDL(MDL-0.005)	
20.	Copper as Cu	mg/l	BDL(MDL-0.01)	
21.	Zinc as Zn	mg/l	0.08	BDL(MDL-0.01)
22.	Cadmium as Cd	mg/l	BDL(MDL-0.001)	
23.	Total Suspended Solids (TSS)	mg/l	16	22
24.	Biochemical Oxygen Demand (BOD) 27°C for 3 days	mg/l	3.20	3.10
25.	Chemical Oxygen Demand (COD)	mg/l	156	144
26.	Dissolved Oxygen (DO)	mg/l	5.60	5.60
27.	Oil & Grease	mg/l	BDL(MDL-0.05)	
28.	Salinity	mg/l	32264.40	30247.88
29.	Temperature	^0C	31	31
30.	Phosphate as PO4	mg/l	0.49	0.28
31.	E.coli or thermotolerant coliform bacteria	MPN/100ml	<2	<2
32.	Faecal coliforms	MPN /100ml	<2	<2
33.	Phytoplankton	cells/ml	80	160
34.	Zooplankton	cells/ml	40	80

Physical parameters such as colour and odour were within the acceptable limit. pH of the samples indicates a neutral to slightly alkaline condition, suitable for marine ecosystems. The samples showed moderate turbidity, higher at MW2, possibly due to local sediment disturbance. This is within acceptable levels but should be monitored during construction as dredging could increase it significantly. Observed levels of BOD, COD and DO indicate that no immediate oxygen stress is evident and suggest minimal organic pollution and inorganic contaminants. The salinity, TDS, sulphates and chloride levels observed are values consistent with coastal marine environments and are not concerning. Phosphates and Nitrates indicate low nutrient levels and that there is no significant eutrophication risk. Levels of Oil & Grease and Heavy Metals are BDL, except Zn, showing minimal industrial pollution. The trace amount of zinc is not alarming.

3.6.4.2. Interpretation of Marine Water Quality Results

The baseline marine water quality is generally good, with no significant pollution indicators.

3.6.4.3. Results and Observations of Marine Sediment Quality Results

Results of marine sediment quality analysis are given in Table 3.13.

Table 3.13: Marine Sediment Quality Analysis Results

S. No	Test Parameters	Unit	Results	
			MS1	MS2
1.	pH	-	7.2	7.3
2.	Texture - Sand	%	45	41
3.	Texture - Silt	%	7.0	7.0
4.	Texture - Clay	%	48	52
5.	Organic Matter	%	0.03	0.042
6.	Total Phosphorus	mg/kg	58.42	48.49
7.	Aluminium	mg/kg	2.02	1.54
8.	Iron	mg/kg	1007.51	1042.31
9.	Lead	mg/kg	BDL(MDL-1.0)	
10.	Manganese	mg/kg	1.05	1.34
11.	Zinc	mg/kg	2.03	3.29
12.	Copper	mg/kg	1.78	2.57
13.	Mercury	mg/kg	BDL(MDL-0.05)	
14.	Cadmium	mg/kg	BDL(MDL-1.0)	
15.	Total Kjeldhal Nitrogen	%	97.63	101.02
16.	Benthos per sample	-	15	13

pH of the samples is within the limits ranging from 7.2 to 7.3. The samples exhibit a variety of textures, with sand and clay being predominant. Organic matter content is relatively low in all samples. Heavy metals such as lead, mercury and cadmium are in below detectable limits in all samples and iron, manganese, zinc and copper are in moderate level. The abundance of benthic organisms is nearly equal in both the samples.

3.6.4.4. Interpretation of Marine Sediment Quality Results

Sediment sample quality is generally good at sampling locations. Presence of benthic organisms indicating overall health of the marine ecosystem.

3.7 Air Environment

Assessment of baseline air quality has to be undertaken to establish the status of exposure of the major sensitive receptors and to assess the background air quality within the study area. It has to be ensured that the samplers used for the monitoring of air quality have been calibrated by NABL accredited laboratories. The locations for Ambient Air Quality Monitoring have been selected with the guidelines given by MoEF&CC.

3.7.1 Sampling Locations and Methodology

The baseline parameters to be monitored were Particulate Matter (PM_{10}), Particulate Matter ($PM_{2.5}$), Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2) and (CO) at 3 locations. The locations were taken based on wind direction and areas considering environmental and social impacts. The details of monitoring locations are given in Table 3.14.

Table 3.14: Ambient Air Quality Monitoring Locations

S. No	Location Code	Location Name/Landmark	Direction	Distance (km)	Selection Criteria	Latitude & Longitude
1.	AQ1	Near Indian Oil Chithari Fuel	N	2.6, from Northern breakwaters	Cross wind direction	12° 21' 35.56" N 75° 3' 53.20" E
2.	AQ2	Near Iqbal HSS, Kanhangad	E	1.3, from southern breakwaters	Down wind direction	12° 19' 50.37" N 75° 4' 41.77" E
3.	AQ3	Near Fishing harbour, Ajanur	-	0	Source of Pollution	12° 20' 10.03" N 75° 3' 54.57" E

The air quality monitoring locations are shown in Figure 3.20.

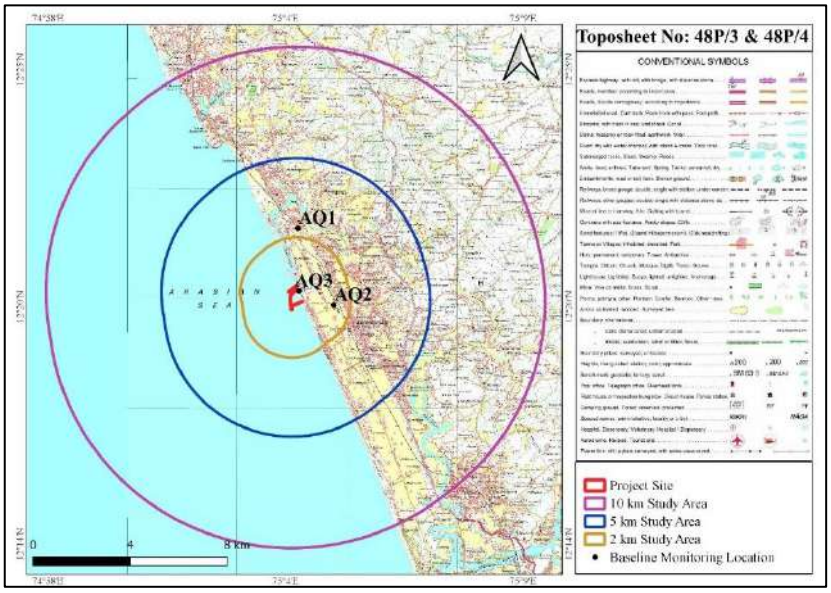


Figure 3.20: Ambient Air Quality Monitoring Locations

3.7.2 Results of Ambient Air Quality Monitoring

The results of the baseline ambient air quality parameters against the permissible ambient air quality standards as per National Ambient Air Quality Standard (NAAQS) issued by Central Pollution Control Board (CPCB) (given in Table 3.18) of the selected location is given in Table 3.15, Table 3.16 and Table 3.17.

Table 3.15: Ambient Air Quality Monitoring Results of PM_{10} and $PM_{2.5}$

Location Code	PM_{10} (µg/m^3)				$PM_{2.5}$ (µg/m^3)			
	Max	Min	Avg.	95th Percentile	Max	Min	Avg.	95th Percentile
AQ1	68.58	66.15	67.36	68.45	22.74	21.01	21.87	22.65
AQ2	63.14	53.81	58.47	62.67	20.39	15.39	17.89	20.14
AQ3	73.57	40.67	57.12	71.92	26.74	9.37	18.05	25.87

Table 3.16: Ambient Air Quality Monitoring Results of SO_2 and NO_2

Location Code	SO_2 (µg/m^3)				NO_2 (µg/m^3)			
	Max	Min	Avg.	95th Percentile	Max	Min	Avg.	95th Percentile
AQ1	13.16	11.15	12.15	13.05	9.88	9.72	9.8	9.87
AQ2	10.17	7.56	8.86	10.03	8.56	4.32	6.44	8.34
AQ3	17.64	3.14	10.39	16.91	13.18	2.06	7.62	12.62

Table 3.17: Ambient Air Quality Monitoring Results of CO

Location Code	CO (mg/m^3)			
	Max	Min	Avg.	95th Percentile
AQ1	0.70	0.65	0.675	0.69
AQ2	0.60	0.6	0.6	0.6
AQ3	1	0.1	0.55	0.95

Table 3.18: NAAQS specified by CPCB and Observed Range of Values at Monitoring Locations

Pollutant	Time Weighted Average	Concentration in Ambient Air as per NAAQS (µg/m^3)	Observed Value Range
PM_{10} (µg/m^3)	24 hours	100	40.67 – 73.57
$PM_{2.5}$ (µg/m^3)	24 hours	60	9.37 – 26.74
SO_2 (µg/m^3)	24 hours	80	3.14 – 17.64
NO_2 (µg/m^3)	24 hours	80	2.06 – 13.18
CO (mg/m^3)	4 hours	2	0.1 - 1

The monitoring results suggests that all the tested parameters PM_{10}, $PM_{2.5}$, SO_2, NO_2 and CO are found within the prescribed limits of NAAQS.

Interpretation

This suggests overall air quality is good in the area.

3.7.3 Meteorological Data

Agro-climatological data published in National Aeronautics and Space Administration – Prediction of Worldwide Energy Resources (NASA POWER), based on satellite observations for one year (January

– December 2022) is given in Table 3.19. The data for the year 2022 was used since monthly and annual data are only accessible till 2022 in NASA POWER.

Table 3.19: Monthly Meteorological Data for the Period of One Year (2022)

Month	Temperature (°C)		Relative Humidity (%)	Avg. Wind Speed (m/s)	Dominant Wind Directions	Average Rainfall (mm)
	Max	Min				
January	31.46	21.14	73.19	2.58	NNW	2.16
February	33.15	21.93	68.44	2.7	WNW	1.73
March	35.1	24.23	66.75	2.64	W	34.81
April	34.04	25.37	77.56	2.42	WNW	95.07
May	32.34	24.76	82.94	3.56	WNW	437.35
June	30.07	24.37	84.75	3.09	W	569.94
July	29.27	24.13	90.25	4.16	WNW	1136.19
August	28.14	23.76	90.94	4.14	WNW	952.13
September	28.46	23.6	88.25	3.13	W	359.15
October	29.76	22.57	83.19	2.2	WNW	175.35
November	30.51	21.96	76.81	1.66	SW	60.94
December	31.34	21.32	73.12	2.05	#N/A	72.83

The monthly annual maximum temperature ranges from 28.14 ℃ to 35.1 ℃ and minimum temperature ranges from 21.14℃ to 25.37℃. The temperature is maximum during the month of March and minimum during the month of January. The majority of rainfall is received from south-west monsoon season from July - August. The monthly annual relative humidity ranges between 66.75% and 90.94%. Highest wind speed was found to occur during the months of July. The wind speed ranges from 1.66 m/s to 4.16 m/s with an average of 2.86 m/s. Predominant wind direction is from WNW to ESE.

The meteorological data such as temperature, relative humidity, wind speed, wind direction, solar radiation and precipitation for the baseline monitoring period were taken from NASA POWER. Wind Rose diagram for the proposed project site for the baseline monitoring period is given in Figure 3.21.

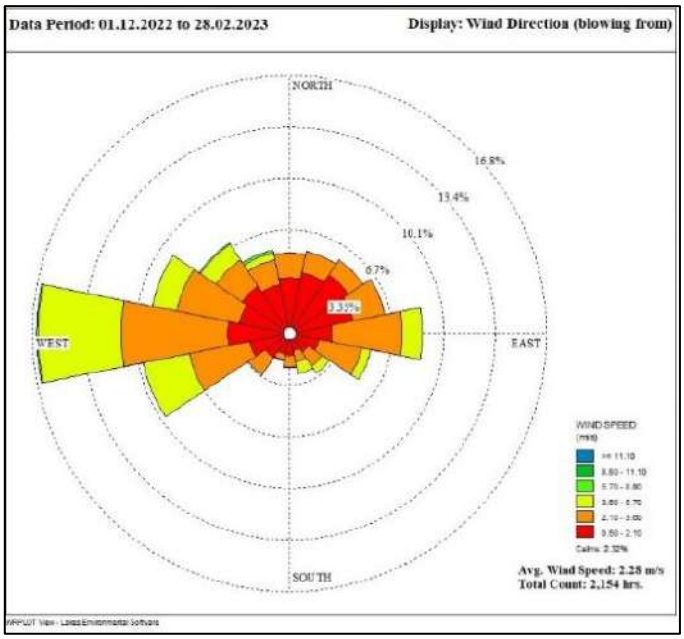


Figure 3.21: Windrose Diagram of Baseline Monitoring Period

The meteorological data of baseline monitoring period meter is given in Table 3.20.

Table 3.20: Meteorological Data of Baseline Monitoring Period

S. No.	Parameter	Minimum	Maximum	Average
1.	Temperature (°C)	25.56	35.58	27.59
2.	Relative Humidity (%)	42.88	92.44	63.47
3.	Wind Speed (m/s)	1.07	4.79	1.89
4.	Solar Radiation (W/m2)	64.26	460.25	110.50
5.	Rainfall	Total rainfall = 16.79mm		
6.	Predominant Wind Direction	W		

3.8 Noise Environment

Baseline noise monitoring is a significant component in evaluating existing conditions of ambient noise in the project site. It further helps to assess whether there is any incremental increase in noise pollution due to the commissioning project.

3.8.1 Sampling Locations and methodology

3 locations were identified for the sampling of ambient noise level in the study area of the project site continuously for 24 hours; 6 AM to 10 PM and 10 PM to 6 AM. The locations have been identified as probable locations where a variation in ambient noise level is expected during construction phase and operation phase. The details of noise level sampling locations are given in Table 3.21.

Table 3.21: Noise Quality Monitoring Locations

S. No.	Location Code	Location Name	Direction	Distance (km)	Justification	Latitude & Longitude
1.	NQ1	Near Indian Oil Chithari Fuel	N	2.6, from Northern breakwaters	Commercial Area	12°21'35.56" N 75°3'53.20" E
2.	NQ2	Near Iqbal HSS, Kanhangad	E	1.3, from southern breakwaters	Silent Zone	12°19'50.37" N 75°4'41.77" E
3.	NQ3	Near Fishing harbour, Ajanur	-	0	Source of pollution	12°20'10.03" N 75°3'54.57" E

Toposheet noise level monitoring locations is given in Figure 3.22.



Figure 3.22: Noise Level Monitoring Locations

3.8.2 Permissible Ambient Noise Quality Standards

The Principal Rules of Noise Pollution were published in the Gazette of India, vide S.O. 50 (E) dated 11.01.2010 under the Environment (Protection) Act, 1986. The Noise Level Limits as per Noise Pollution (Regulation and Control) Rules, 2000 and observed baseline ambient noise quality parameters should confirm to the standards specified during the day as well as in the night. Ambient noise level monitoring results are given in Table 3.22.

Table 3.22: Ambient Noise Level Monitoring Results & Noise Level Limits

Location Code	Category	Results in dB (A) Leq		Limit in dB (A) Leq*	
		Day Time (6am – 10pm)	Night Time (10pm – 6am)	Day Time (6am – 10pm)	Night Time (10pm – 6am)
NQ1	Commercial Area	49.8	40.4	**65**	**55**
NQ2	Silence Zone	48.1	37.3	**50**	**40**
NQ3	Commercial Area	42.5	35.6	**65**	**55**

- Commercial Area - Noise quality result of Leq Day and Leq Night time were in the limits of standards prescribed by CPCB for industrial zone as per Noise Pollution (Regulation and Control) Rules, 2000.
- Silence zone - Results were in the limits of standards prescribed by CPCB for silence zone as per Noise Pollution (Regulation and Control) Rules, 2000.

Interpretation

Overall, the results suggest that noise pollution is not a significant concern in the areas around the monitoring locations.

3.9 Biological Environment

Study of biological environment is one of the most important aspects for EIA. Biological communities are the indicators of climatic and edaphic factors, which includes mainly terrestrial ecosystem and aquatic ecosystem.

3.9.1 Objectives of Ecological Study

The study was undertaken with following objectives:

- To evaluate the distribution and composition of vegetation in 10 km study area.
- To assess the distribution of faunal population in 10 km study area.
- To determine the potential ecological impacts of the proposed project on surrounding area and recommendation of mitigation measures, if necessary.
- To identify presence of any species listed under Wildlife (Protection) Amendment Act, 2022 and International Union for Conservation of Nature (IUCN) Red List of Threatened Species.

3.9.2 Sampling Locations

Ecological study was conducted at 4 sampling locations. Toposheet showing sampling locations are given in Figure 3.23.

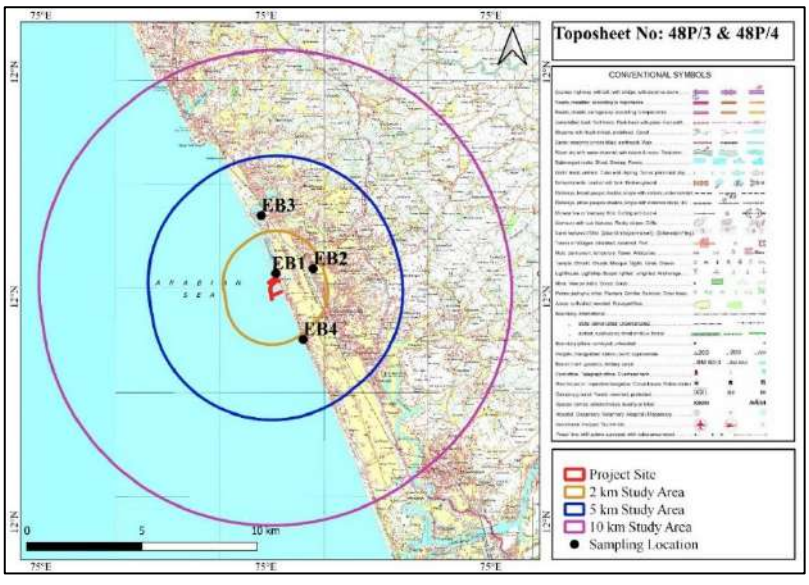


Figure 3.23: Sampling Locations of Ecological Study

3.9.3 Terrestrial Ecology

Terrestrial Flora

Total of 86 floral species are identified from selected locations of 10 km study area, which includes 28 species of trees, 4 species of palms, 18 species of herbs, 16 species of shrubs, 5 species of grass and 15 species of climbers. List of flora observed in the study area is given in Table 3.23.

Table 3.23: List of Flora observed in the Study Area

S. No.	Scientific Name	Local Name / Common Name	Family	Native / Exotic
Trees				
1.	*Acacia auriculiformis**	Acacia	Fabaceae	Exotic
2.	*Albizia lebbeck*	Vaga	Fabaceae	Native
3.	*Alstonia scholaris*	Ezhilamppala	Apocynaceae	Native
4.	*Anacardium occidentale**	Kasumavu	Anacardiaceae	Exotic
5.	*Artocarpus heterophyllus**	Chakka	Moraceae	Native
6.	*Azadirachta indica**	Ariyaveppu	Meliaceae	Native
7.	*Bauhinia purpurea*	Chuvanna Mandaram	Fabaceae	Native
8.	*Butea monosperma*	Plaash	Fabaceae	Native
9.	*Casuarina equisetifolia*	Choolamaram	Casuarinaceae	Exotic
10.	*Ficus benghalensis*	Peraal	Moraceae	Native
11.	*Gliricidia sepium*	Seemakonna	Fabaceae	Exotic
12.	*Leucaena leucocephala*	Black wood	Fabaceae	Exotic
13.	*Macaranga peltate**	Vatta	Euphorbiaceae	Native
14.	*Mangifera indica**	Maavu	Anacardiaceae	Native
15.	*Manilkara zapota*	Chikku	Sapotaceae	Exotic
16.	*Melia azedarach*	Malaveppu	Meliaceae	Native
17.	*Moringa oleifera**	Muringai	Moringaceae	Native
18.	*Muntingia calabura*	Pancharappazham	Muntingiaceae	Exotic
19.	*Phyllanthus emblica*	Nelli	Phyllanthaceae	Native
20.	*Polyalthia longifolia*	Aranamaram	Annonaceae	Native
21.	*Pongamia pinnata*	Pongam	Fabaceae	Native
22.	*Psidium guajava**	Pera	Myrtaceae	Exotic
23.	*Samanea saman*	Mazhamaram	Fabaceae	Exotic
24.	*Syzygium cumini*	Njaval	Myrtaceae	Native
25.	*Tamarindus indica**	Kolpuli	Caesalpiniaceae	Exotic
26.	*Terminalia arjuna*	Nirmarutu	Combretaceae	Native
27.	*Terminalia catappa**	Badam	Combretaceae	Exotic
28.	*Thespesia populnea**	Poovaras	Malvaceae	Native
Palms				
1.	*Areca catechu**	Kavungu	Palmae	Native

S. No.	Scientific Name	Local Name / Common Name	Family	Native / Exotic
2.	*Borassus flabellifer*	Nonku	Arecaceae	Native
3.	*Caryota urens*	Anappana	Arecaceae	Native
4.	*Cocos nucifera**	Thengu	Arecaceae	Native
Herbs				
1.	*Ageratum conyzoides**	Kumminipacha	Asteraceae	Exotic
2.	*Alternanthera sessilis**	Kozhuppacheera	Amaranthaceae	Native
3.	*Boerhavia diffusa**	Thazhuthama	Nyctaginaceae	Native
4.	*Catharanthus roseus*	Shavamnaari	Apocynaceae	Exotic
5.	*Centella asiatica*	Muthil	Apiaceae	Native
6.	*Chromolaena odorata**	Communistpacha	Asteraceae	Exotic
7.	*Cleome viscosa*	Naivela	Capparidaceae	Exotic
8.	*Colocasia esculenta*	Chembu	Araceae	Native
9.	*Dipteracanthus prostrates**	Thuppalampotti	Acanthaceae	Native
10.	*Euphorbia hirta*	Nelapaala	Euphorbiaceae	Exotic
11.	*Fimbristylis cymose**	Vayal Potta	Cyperaceae	Native
12.	*Gomphrena celosioides*	Neervadamalli	Amaranthaceae	Exotic
13.	*Ipomoea pes-caprae**	Kuthirakulamban	Convolvulaceae	Native
14.	*Launaea sarmentosa**	Kadalkozhuppa	Asteraceae	Native
15.	*Mimosa pudica**	Thottavadi	Mimosaceae	Exotic
16.	*Musa paradisiaca**	Vazha	Musaceae	Exotic
17.	*Tridax procumbens**	Sanippoovu	Asteraceae	Exotic
18.	*Wedelia trilobata**	Singapore Daisy	Asteraceae	Exotic
Shrubs				
1.	*Barleria cristata*	Karimkurunni	Acanthaceae	Native
2.	*Bougainvillea spectabilis*	-	Nyctaginaceae	Exotic
3.	*Caesalpinia pulcherrima**	Settimandaram	Fabaceae	Exotic
4.	*Calotropis gigantea**	Erikku	Asclepiadaceae	Native
5.	*Clerodendrum inerme*	Cheruchinna	Verbenaceae	Native
6.	*Helicteres isora*	Edampiri-Valampiri	Sterculiaceae	Native
7.	*Hibiscus rosa-sinensis*	Chemparati	Malvaceae	Exotic
8.	*Hibiscus surattensis*	Kakkapoovu	Malvaceae	Native
9.	*Ixora coccinea**	Thechi	Rubiaceae	Native
10.	*Ixora elongata*	Rose Chetthi	Rubiaceae	Native
11.	*Jatropha curcas*	Katalavanakku	Euphorbiaceae	Exotic
12.	*Lantana camara**	Arippoo	Verbenaceae	Exotic
13.	*Mussaenda frondosa**	Vellila	Rubiaceae	Native
14.	*Phyllanthus reticulatus**	Nirnelli	Phyllanthaceae	Native
15.	*Urena lobata*	Oorpam	Malvaceae	Native

S. No.	Scientific Name	Local Name / Common Name	Family	Native / Exotic
16.	*Vitex trifolia**	Vellanochi	Verbenaceae	Native
Grasses				
1.	*Chloris barbata**	Kodappullu	Poaceae	Exotic
2.	*Cynodon dactylon**	Karukappullu	Poaceae	Native
3.	*Fimbristylis cymosa*	Vayalpotta	Cyperaceae	Exotic
4.	*Paspalum distichum*	Kulavaragu	Poaceae	Native
5.	*Zoysia matrella**	Cherupullu	Poaceae	Native
Climbers				
1.	*Antigonon leptopus*	Thenpoovalli	Polygonaceae	Exotic
2.	*Calopogonium mucunoides**	Wild Ground Nut	Fabaceae	Exotic
3.	*Centrosema mole**	Kattupayar	Fabaceae	Exotic
4.	*Combretum indicum**	Yasodapoo	Combretaceae	Exotic
5.	*Dioscorea bulbifera*	Kattukachil	Dioscoreaceae	Native
6.	*Jasminum multiflorum*	Mulla	Oleaceae	Native
7.	*Mikania micrantha**	Dhridharashtrappacha	Asteraceae	Exotic
8.	*Mimosa diplotricha*	Anathottavadi	Fabaceae	Exotic
9.	*Passiflora foetida*	Poochapazham	Passifloraceae	Exotic
10.	*Piper longum*	Thippali	Piperaceae	Native
11.	*Piper nigrum*	Kurumulaku	Piperaceae	Native
12.	*Pueraria phaseoloides**	Thottapayar	Fabaceae	Exotic
13.	*Quisqualis indica*	Thookuchethi	Combretaceae	Native
14.	*Tinospora cordifolia**	Chittamruthu	Menispermaceae	Native
15.	*Xenostegia tridentata*	Prasarani	Convolvulaceae	Native

Source: Primary data generated by ULTRA TECH Team

**Also observed in the core zone*

Photographs of flora observed in the study area is given in Figure 3.24.



Cocos nucifera



Terminalia catappa



Casuarina equisetifolia



Acacia auriculiformis


Ipomoea pes-caprae


Vitex trifolia


Chromolaena odorata


Launaea sarmentosa

Figure 3.24: Photographs of Flora observed in the Study Area

- *Rare/Endangered/Threatened (RET) Flora*

There is no RET species of flora within the study area as per the IUCN Red List of Threatened Species-2014.

Terrestrial Fauna

Transact method was employed for the identification of birds and butterflies. Mammals were recorded by direct sightings and indirect evidences such as pug marks, scats, droppings etc. The authenticity of faunal occurrence was confirmed by interactions with local people. Total of 7 species of insects, 6 species of odonates, 14 species of butterflies, 6 species of reptiles, 16 species of avifauna and 8 species of mammals were observed in study area. List of fauna observed in study area are given in Table 3.24.

Table 3.24: List of Fauna observed in the Study Area

S. No.	Scientific Name	Family	Common Name	IUCN Status** / WPA Schedule
Insects				
1.	*Abscondita chinensis**	Lampyridae	Firefly Beetle	-
2.	*Anoplolepis gracilipes**	Formicidae	Yellow Crazy Ant	-
3.	*Apis cerana indica*	Apidae	Asian Honey Bee	-
4.	*Camponotus compressus*	Formicidae	Indian Black Ant	-
5.	*Ommatoiulus moreleti**	Julidae	Portuguese Millipede	-
6.	*Omocestus viridulus**	Acrididae	Common Green Grasshopper	-
7.	*Probergrothius sanguinolens*	Pyrrhocoridae	Indian Red Bug	-
Odonates				
1.	*Bradinopyga geminata*	Libellulidae	Granite Ghost	LC
2.	*Diplacodes trivialis**	Libellulidae	Chalky Percher	LC
3.	*Orthetrum sabina**	Libellulidae	Slender Skimmer	LC
4.	*Rhodothemis rufa*	Libellulidae	Common Redbolt	LC
5.	*Trithemis festiva*	Libellulidae	Indigo Dropwing	LC

S. No.	Scientific Name	Family	Common Name	IUCN Status** / WPA Schedule
6.	*Vestalis apicalis*	Calopterygidae	Black Tipped Forest Glory	LC
		Butterflies		
1.	*Acraea terpsicore**	Nymphalidae	Tawny Coster	-
2.	*Castalius rosimon**	Lycaenidae	Common Pierrot	-
3.	*Catopsilia Pomona**	Pieridae	Common Emigrant	-
4.	*Colotis aurora*	Pieridae	Plain Orange-tip	-
5.	*Euploea core**	Nymphalidae	Common Crow	LC
6.	*Eurema hecabe*	Pieridae	Grass Yellow	LC
7.	*Junonia iphita**	Nymphalidae	Chocolate Pansy	-
8.	*Junonia lemonias**	Nymphalidae	Lemon Pansy	-
9.	*Leptosia nina**	Pieridae	Psyche	-
10.	*Melanitis leda*	Nymphalidae	Twilight Brown	LC
11.	*Mycalesis mineus*	Nymphalidae	Branded Bushbrown	-
12.	*Neptis hylas**	Nymphalidae	Common Sailor	-
13.	*Papilio polytes*	Papilionidae	Common Mormon	-
14.	*Tirumala limniace**	Nymphalidae	Blue Tiger	-
		Reptiles		
1.	*Calotes versicolor**	Agamidae	Garden Lizard	LC
2.	*Eutropis carinata**	Scincidae	Keeled Indian Mabuya	LC
3.	*Hemidactylus flaviviridis**	Gekkonidae	Yellow Bellied House Gecko	LC
4.	*Lampropholis guichenoti*	Scincidae	Pale-flecked Garden Sunskink	LC
5.	*Lygosoma punctata*	Scincidae	Common Dotted Garden Skink	LC
6.	*Ptyas mucosa*	Colubridae	Rat Snake	LC, Sch I (Part C)
		Avifauna		
1.	*Alcedo atthis**	Alcedinidae	Common Kingfisher	LC, Sch II (Part B)
2.	Alexandrinus krameri	Psittacidae	Rose-ringed Parakeet	LC, Sch II (Part B)
3.	*Argya striata**	Leiotrichidae	Jungle Babbler	LC, Sch II (Part B)
4.	*Bubulcus Egret*	Ardeidae	Cattle Egret	Sch II (Part B)
5.	*Centropus sinensis*	Cuculidae	Greater Coucal	LC, Sch II (Part B)
6.	*Cinnyris asiaticus*	Nectariniidae	Purple Sunbird	LC, Sch II (Part B)
7.	*Columba livia**	Columbidae	Rock Dove	LC
8.	*Corvus splendens**	Corvidae	House Crow	LC
9.	*Dicrurus macrocercus**	Dicruridae	Black Drongo	LC, Sch II (Part B)
10.	*Egretta garzetta**	Ardeidae	Little Egret	LC, Sch II (Part B)

S. No.	Scientific Name	Family	Common Name	IUCN Status** / WPA Schedule
11.	*Eudynamys scolopaceus*	Cuculidae	Asian Koel	LC, Sch II (Part B)
12.	*Haliastur indus*	Accipitridae	Brahminy Kite	LC, Sch I (Part B)
13.	*Microcarbo niger**	Phalacrocoracidae	Little Cormorant	LC, Sch II (Part B)
14.	*Milvus migrans*	Accipitridae	Black Kite	LC, Sch II (Part B)
15.	*Orthotomus sutorius*	Cisticolidae	Common Tailorbird	LC, Sch II (Part B)
16.	Yungipicus nanus	Picidae	Brown-capped Pygmy Woodpecker	LC, Sch II (Part B)
Mammals				
1.	*Bandicota indica**	Muridae	Greater Bandicoot Rat	LC
2.	*Bos taurus**	Bovidae	Cow	-
3.	*Canis lupus familiaris**	Canidae	Indian Native Dog	-
4.	*Capra aegagrus hircus*	Bovidae	Goat	-
5.	*Felis catus**	Felidae	Domestic Cat	-
6.	*Funambulus palmarum**	Sciuridae	Indian palm squirrel	LC
7.	*Mus musculus*	Muridae	House Mouse	LC
8.	*Sus scrofa*	Suidae	Wild Boar	LC, Sch II (Part A)

Source: Primary data generated by ULTRA TECH Team

**Also observed in the core zone*

***LC - Least Concern*

- *Rare/Endangered/Threatened (RET) Fauna*

No threatened, endangered & endemic species and migratory fauna were observed in the study area as per International Union for Conservation of Nature (IUCN) Red List of Threatened Species. *Ptyas mucosa* (Rat Snake), *Haliastur indus* (Brahminy Kite), Schedule I species as per Wildlife (Protection) Amendment Act, 2022 were found in the study area.

National Parks and Wildlife Sanctuaries

There is no National Parks and Wildlife Sanctuaries present within 10 km study area.

3.9.4 Aquatic Ecology

List of aquatic organisms observed in the study area is given in Table 3.25.

Table 3.25: List of Aquatic Organisms observed in the Study Area

S. No.	Scientific Name	Family	Common Name	IUCN Status**/ WPA Schedule
Arthropods				
1.	*Metapenaeus monoceros*	Penaeidae	Speckled Shrimp	-
2.	*Ocypode ceratophthalmus**	Ocypodidae	Horn-eyed Ghost Crab	-

S. No.	Scientific Name	Family	Common Name	IUCN Status**/ WPA Schedule
3.	*Penaeus indicus*	Penaeidae	Indian Prawn	-
4.	*Penaeus monodon*	Penaeidae	Giant Tiger Prawn	-
5.	*Tachypleus gigas*	Limulidae	Horseshoe Crab	DD, Sch II (Part G)
Molluscs				
1.	*Meretrix casta*	Veneridae	Backwater Hard Clam	-
2.	*Perna indica**	Mytilidae	Brown Mussel	-
3.	*Perna viridis*	Mytilidae	Asian Green Mussel	-
4.	*Portunus sanguinolentus*	Portunidae	Three Spot Swimming Crab	-
5.	*Sepia spp.**	Sepiidae	Cuttlefish	-
Fishes				
1.	*Auxis thazard thazard*	Scombridae	Frigate tuna	-
2.	*Diodon hystrix*	Diodontidae	Spot fin Porcupinefish	LC
3.	*Lactarius lactarius*	Lactariidae	False Trevally	-
4.	*Mugil cephalus*	Mugilidae	Flathead Mulle	LC
5.	*Nemipterus japonicus*	Nemipteridae	Pink Perch	LC
6.	*Pampus argenteus*	Stromateidae	Silver Pomfret	-
7.	*Parastromateus niger*	Carangidae	Black Pomfret	LC
8.	*Plicofollis dussumier*	Ariidae	Blacktip sea catfish	LC
9.	*Rastrelliger kanagurta*	Scombridae	Mackerel	DD
10.	*Sardinella gibbosa*	Clupeidae	Goldstripe sardinella	LC
11.	*Sardinella longiceps*	Clupeidae	Indian Oil Sardine	LC
12.	*Stolephorus indicus*	Engraulidae	Indian Anchovy	LC
Echinodermates				
1.	*Asterias spp.**	Asteriidae	Star Fish	-

Source: Primary data generated by ULTRA TECH Team

**Also observed in the core zone*

***LC - Least Concern, DD – Data Deficient*

Photographs of fauna observed in the study area is given in Figure 3.25.



Asterias spp.



Sepia spp. (Cuttlefish Bone)



Ocypode ceratophthalmus

Figure 3.25: Photographs of Fauna observed in the Study Area

3.9.5 Interpretation

The project site possesses medium biodiversity with reference to flora and fauna. Biodiversity will be increased by the development of landscaping in an area of about 3,000 m^2 through the plantation of different varieties of trees considering different environmental and ecological components. Apparently, project activities will not have any adverse impact on flora and fauna in the study area. No threatened, endangered, vulnerable & endemic species of flora and fauna were observed in the study area as per International Union for Conservation of Nature (IUCN) Red List of Threatened Species.

3.10 Socio-Economic Environment

The socio-economic evaluation focuses on the project impact on social and economic well-being of the population within 10.0 km radius of the project site and has been prepared based on secondary data extracted from Primary Census Abstract, Census of India 2011. Demographic data of Ajanur, village, where the project site reside is given in Table 3.26.

Table 3.26: Demographic Attributes of the Study Area

Name of village	No. of households	Total population	Literates	Working Population	Main worker	Marginal worker	Non worker
Ajanur	7,027	33,079	25,791	10,873	9,141	1,732	22,206

Data Source: Census of India, 2011

Out of total population, are 32.86 % are working population. Main workers, marginal workers and non-workers are 27.6 %, 5. 2 % and 67.1 % of total population respectively.

3.10.1 Stakeholder Consultation

Consultation meeting was conducted with Ms. Shobha T. (President of Grama Panchayath), Mr. Ibrahim Mavikaal (ward member of ward 18), Mr. K. Ravindran (ward member of ward 17), Ms Sathi K. (ward member of ward 20), Ms. Meena K. (Chairperson, Development Standing Committee), and Mr. Rajesh P. R. (Assistant Engineer, Harbour Engineering Department) on 14.03.2023 using a structural questionnaire to understand the existing socio-economic conditions, improvement required for the existing social infrastructures, issues and concerns of public regarding proposed harbour etc. were given.

During the consultation, it was learned that:

- The proposed project received widespread support from the community as it was expected to create employment opportunities. A significant portion of the underprivileged fishing community in Kasaragod district resides in Ajanur. The construction of a harbour in this region could potentially improve the livelihoods of the local fishing community and thereby improve their current living conditions.
- Considering the site's historical record of boat accidents, the construction of a harbour is deemed essential to enhance safety and reduce the risk of future incidents.
- The only concern regarding the proposed project is waste disposal.
- While some stakeholders requested improvements, the primary suggestions cantered on increasing the number of rescue boats and personnel.

- Additionally, coastal erosion and sea encroachment in the area necessitated the construction of sea walls, while stakeholders also suggested improvements to the existing fisheries station facilities.

3.10.2 Door-to-Door Survey

Methodology of door-to-survey

10.0 km area around the project site is selected for door-to-door survey. Stratified random sampling was conducted where the area was divided into three zones based on the distance from the proposed project site. The study area was classified viz., up to 2.0 km, 2.0 km to 5.0 km and 5.0 km to 10.0 km from project site for conducting door-to-door survey. A total of 6 responses were recorded during the survey. Photographs of stakeholder consultation and door-to-door survey are given in Figure 3.26.



Figure 3.26: Photographs of Stakeholder Consultation & Door-to-Door Survey

From the door-to-door survey it was observed that, 83% of respondents have a secondary education, and 17% have a primary education. In terms of occupation, 83% are fishermen, and 17% are pensioners.

The economic status of the people was assessed based on their ration cards. The majority of people, approximately 50%, possess a pink card, which indicates that majority of the population belong to below poverty line, while 33% have a yellow card and 17% have a blue card. The proximity of the sea and the issue of saltwater intrusion have forced all residents to depend exclusively on pipeline water for their water needs.

The region faces recurring threats of flooding and sea encroachment. 20% of respondents reported experiencing both a tsunami and a flood, while 60% indicated that they face sea attack.

In the course of the survey, they were asked about the need or improvement in basic amenities such as electricity, drinking water supply, street lights, solid waste management, liquid waste management, educational institution, roads, health sector etc. Among the most pressing needs identified were drinking water (28%), street lights (24%), sea walls (18%), electricity and solid waste management (12%).

The graphical representation of the summary of door-to-door survey is shown in Figure 3.27.

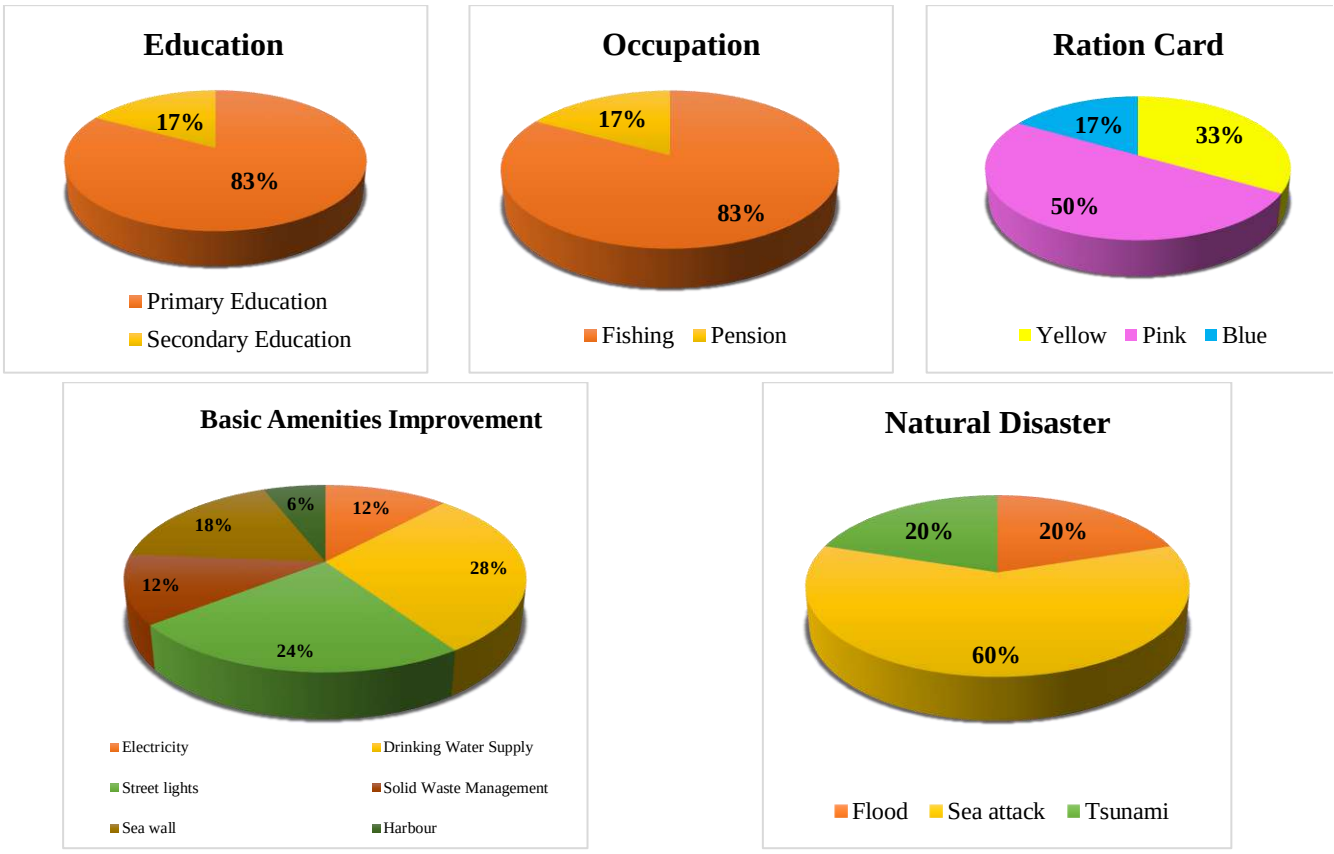


Figure 3.27: Summary of Door-to-Door Survey

3.11 Natural Hazards

3.11.1 Cyclone

As per the Wind Hazard Map prepared by Building Materials and Technology Promotion Council (BMTPC), Ministry of Housing & Urban Affairs (MoH), Government of India (GoI), the project location is coming under Moderate Damage Risk Zone B - Vb: 39 m/s. Wind Hazard given in Figure 3.28. Cyclone Occurrence Map (Coastal India) prepared by BMTPC shows the Maximum Sustained Windspeed (MSW) is 34 - 47 knots for the site. The Cyclone Occurrence Map is given in Figure 3.29.

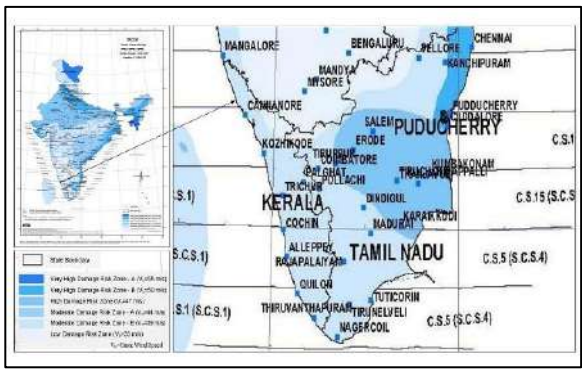


Figure 3.28: Wind Hazard Map

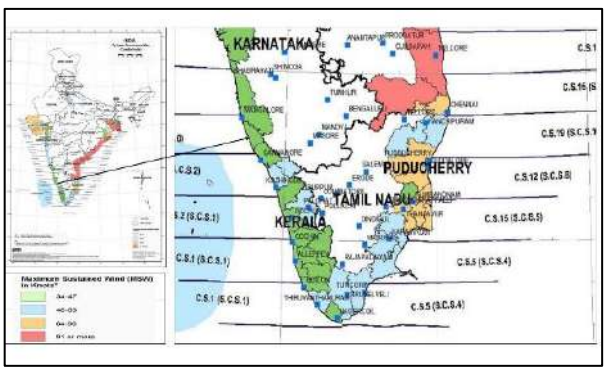


Figure 3.29: Cyclone Occurrence Map

Source: BMTPC

3.11.2 Lightning

As per DDMP Kasaragod 2015, the project site is near to lightning susceptible area and the lightning frequency per year for the project site is 1. However, no history of lightning was reported by the locals during the socioeconomic survey. The Lightning Susceptibility Map and Lightning Frequency Map of Kasaragod district are given in Figure 3.30 and Figure 3.31 respectively.

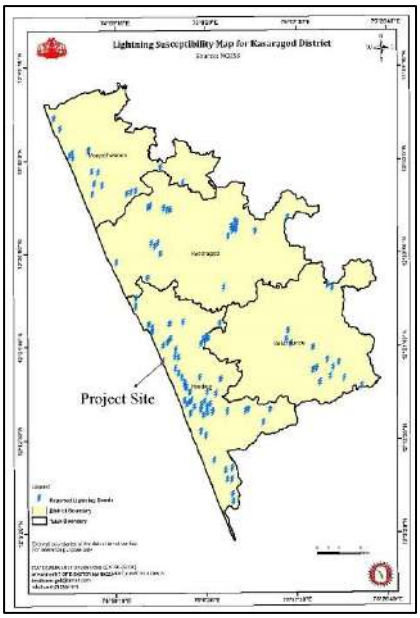


Figure 3.30: Lightning Susceptibility Map

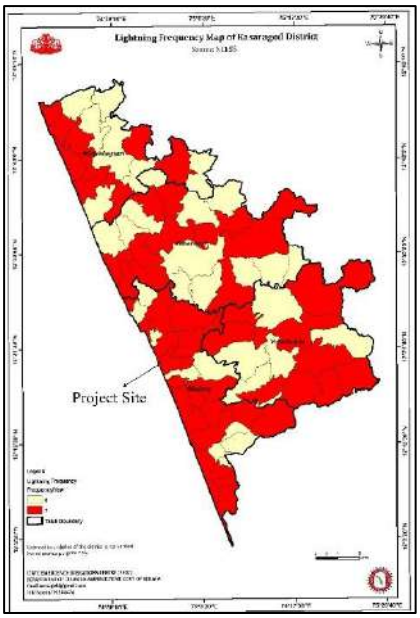


Figure 3.31: Lightning Frequency Map

Source: DDMP 2015, Kasaragod

3.11.3 Earthquake

As per the Seismic Zone classification by IS 1893 (Part-I): 2002 prepared by Geological Survey of India (GSI) the proposed project site is falls under Seismic Zone III (Moderate Risk Zone). The Seismic Zone Map of India is given in Figure 3.32.

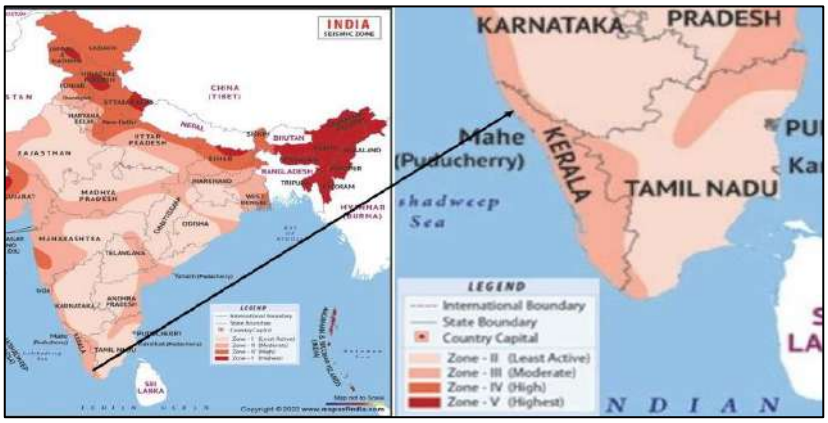
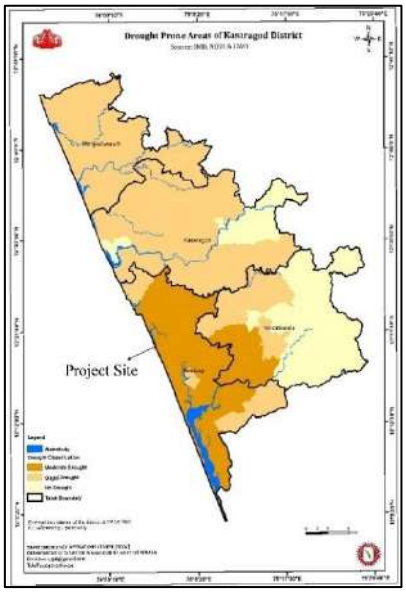


Figure 3.32: Earthquake Susceptibility Map

Source: Geological Survey of India

3.11.4 Drought

As per Drought Prone Area Map of Kasaragod district prepared by NCESS for DDMP 2015 given in Figure 3.33 the project site falls in moderate drought prone area.

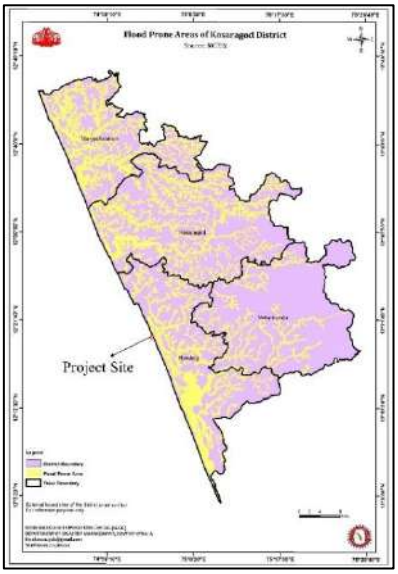


Source: DDMP 2015, Kasaragod

Figure 3.33: Drought Prone Area Map

3.11.5 Flood

As per the flood susceptibility map of Kasaragod district prepared by NCESS for DDMP 2015 given in Figure 3.34 project site is falls under Flood Prone Area.

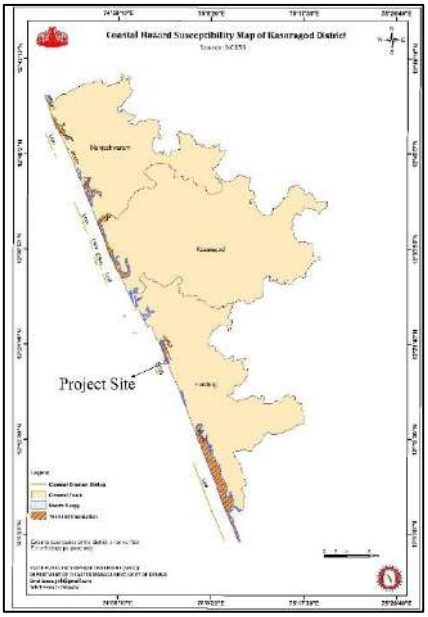


Source: DDMP 2015, Kasaragod

Figure 3.34: Flood Susceptibility Map

3.11.6 Coastal Hazard

As per the coastal hazard susceptibility map map of Kasaragod district prepared by NCESS for DDMP 2015, the project site falls in storm surge and tsunami inundation region. The coastal hazard susceptibility map is given in Figure 3.35.



Source: DDMP 2015, Kasaragod

Figure 3.35: Coastal Hazard Susceptibility Map

Chapter 4 Anticipated Impacts & Mitigation Measures

4.1 Environmental Attributes for Impact Assessment

The construction and operation of a fishing harbour in Ajanur, encompasses environmental attributes that may experience both positive and negative impacts, each with its own potential effects during the design, construction, operation, and decommissioning phases. The anticipated impacts from the proposed project are identified for the following major attributes of the environment:

1. Land Environment
2. Water Environment (*Surface water, Groundwater and Marine water*)
3. Air Environment
4. Noise and Vibration
5. Ecology and Biodiversity (*Species, Population, Habitats and Communities*)
6. Occupational Health and Safety
7. Socio-economic and Cultural
8. Climate (*Microclimate and Macro-climate*)

4.2 Stages of Project Implementation

The proposed project will be implemented in three distinct phases as depicted in Figure 4.1. The impacts on the various environmental attributes were assessed considering these three phases of the project with distinct impacts anticipated at each stage.



Figure 4.1: Phases of Project Implementation

4.3 Anticipated Impacts and Mitigation Measures: Pre-construction and Design Phase

The anticipated environmental impacts of the project in construction as well as operation phase can be mitigated, if adequate measures are adopted in the design and pre-construction stage of the project by integrating safety and environmental considerations into the project design and by adequate planning for implementation of the project. The anticipated environmental impacts and the corresponding mitigation measures which can be adopted in pre-construction and design phase are listed in Table 4.1.

Table 4.1: Anticipated Impacts and Mitigation Measures: Pre-construction & Design Phase

Aspect	Anticipated Environmental Impacts	Mitigation Measures proposed
P.1 Design		
P.1.1 Design of breakwaters and harbour facilities	• If breakwaters are not efficiently designed to cater to the site conditions, it can lead to the environmental/ social impacts	• The design shall be implemented as per the recommendation of model study of CWPRS. • The engineering design and materials for constructions shall be selected appropriately suiting for the location and the need of the project.

Aspect	Anticipated Environmental Impacts	Mitigation Measures proposed
		• Regular maintenance and repair of breakwaters shall be proposed for the effective coastal protection.
P.1.2 Design for safety against natural hazards		
P.1.2.1 Costal Hazard	• Possible damage to life, property and environmental attributes from the deposition of sediments at harbour mouth and river mouth. • Erosion of land resulting in loss of beach land.	• Design of structures was done considering relevant environmental parameters. • The breakwaters and river training walls were designed according to the recommendation of model study to provide a tranquil harbour basin and stable river mouth. • Maintenance dredging is proposed in the model study for maintaining adequate basin depth and depth in the river mouth. • Construction materials that are suitably selected to be storm- and corrosion-resistant.
P.1.2.2 Earthquake	• Kerala falls in Seismic Zone III • Possible damage to life and property from earthquakes	Relevant IS code (IS: 1893 – 1984) shall be adopted in designing the structure to sustain the magnitude of earthquake corresponding to Zone III.
P.1.2.3 Cyclone	• The site falls under moderate damage risk zone B (the basic wind speed, Vb = 39 m/s), as per the Wind and Cyclone Hazard Map of India. • Possible damage to life and property from cyclones	Relevant IS 15498 (2004): shall be adopted in designing the structure to sustain the magnitude of the cyclone corresponding to moderate zone.
P.2 Site selection of various facilities and equipment		
P.2.1. Location of storage of materials, construction equipment, vehicles, machinery, etc.	• There can be dust emissions or leakages leading to air, water or soil pollution if the storage areas are not carefully planned and located. • Accidental spillages can affect the health of construction workers/local population and marine life	• The storage locations should be clearly demarcated, and warning signboards shall be erected, especially in the case of storage of hazardous chemicals and avoid locations near sensitive coastal zones. • Fuel storage and refuelling sites to be at pre-designed location and kept away from the shoreline. • Preventive measures shall be strictly followed to avoid accidental spillage of fuels and in case of any accidental spillage, proper

Aspect	Anticipated Environmental Impacts	Mitigation Measures proposed
		measure shall be taken, like secondary containment.
P.3 Statutory Approvals and Permits		
P.3.1 Obtaining the necessary Statutory Clearances, Approvals and Permits	Not obtaining the statutory approvals leads to non-compliances or violations of environmental norms	Statutory clearances shall be obtained which includes CRZ Clearance, NOCs from Fire and Rescue Services, consent from PCB etc.
P.4 Identification of sources of resources		
P.4.1 Quarries	• Transporting granite from unauthorized quarries. • Over extraction of rocks for the construction purposes can impose adverse effects.	Granite stones shall be purchased from quarries having valid EC as per the requirement of the construction through lorries/ tippers.
P.4.2 Water for Construction	Withdrawal of groundwater from CRZ areas will result in saltwater intrusion	• Drinking water required for the construction workers will be sourced from nearby drinking water suppliers in tankers. • Open well proposed to be used as one of the sources of fresh water is selected from outside CRZ area. No withdrawal of groundwater from CRZ area is proposed.
P.4.3 Workforce for construction	Not providing job opportunities for local population can create unrest and can lead to conflicts between the construction workforce and local population	The skilled/ trained workforce shall be deployed from the local population for the construction and operational activities.
P.5 Preparation of Environmental Management Implementation Plan		
P.5.1 Comprehensive Solid Waste Management Plan	Inadequate waste management measures lead to pollution of the environment and can cause inconvenience to the local population.	• Comprehensive Solid Waste Management Plan shall be prepared to include the following, o Construction waste management o Solid, Hazardous and E-waste management • Locations for temporary storage of all biodegradable, non-biodegradable and hazardous waste shall be demarcated.

Aspect	Anticipated Environmental Impacts	Mitigation Measures proposed
P.5.2 Construction Schedule	• Construction activities if not carried out as per the schedule can cause project cost escalation • Construction during the monsoon season can cause water pollution due to leaching of chemicals from constructions materials/ wastes, etc.	• The detailed construction schedule for 48 months shall be prepared before the commencement of the construction activities. • All the construction activities shall be suspended during heavy rains and rough tide days.
P.6 Preparation of Standard Operating Procedures (SOPs)		
P.6.1 Preparation of SOPs	Environmental degradation & inconvenience to the public if suitable construction methodologies aren't adopted.	• SOPs based on best engineering practices shall be prepared for construction of breakwaters, and the harbour facilities. • Create SOPs for handling accidental spills or leaks, especially during fuel handling or chemical storage, to ensure quick and effective response.
P.7 Implementation - Information Meetings		
P.7.1 Implementation - Information Meetings and Orientation Training	There can be local resistance to the construction activities, if the public is not made aware of the various aspects of construction such as provisions for beach landing, traffic management for construction vehicles, construction schedule, any safety risks to local population, etc.	• At least two implementation information meetings shall be organized for general public, to consult and inform people about the plans covering overall construction schedule, safety, traffic safety and management plan, measures to minimize disruption, damage and in convenience to locals. • The people should be informed about the date, time and venue at least 7 days prior to meetings. • Set up grievance redressal system where the local population can report issues or concerns during construction and operation phase. A dedicated hotline or email can be made available to ensure swift action.

4.4 Anticipated Impacts and Mitigation Measures during the Construction Phase

The impacts during the construction phase can arise from the various construction activities such as the procurement/ transportation/ storage of construction material, movement and operations of various machinery/ equipment/ vehicles, construction works in the water body etc. There can be inconveniences

to the fishers, current users of the area and local public, if proper management plans are not implemented for navigation. Management of solid and liquid waste can affect both the environment as well as the public. The anticipated impacts in the construction phase and the corresponding mitigation measures to be adopted during preparatory activities of the construction phase are depicted in Table 4.2

Table 4.2: Anticipated Impacts & Mitigation Measures: Construction Phase

Aspect	Anticipated Environmental Impacts	Mitigation Measures proposed
C.1. Preparatory Activities		
C.1.1 Preparatory Activities	If the environmental implementation plan with roles and responsibilities for execution are not finalized before the start of constructions, field implementation of the EMP may not happen as envisaged, resulting in environmental degradation and inconvenience to the local population.	Defining the roles and responsibilities of the various stakeholders for implementation of the EMP before the commencement of the constructions.
C.1.2 Temporary storage area	• Nuisance to the fishers due to occupying their anchoring area for storage of construction materials/ equipment. • Air and noise pollution during the transport, storage and handling of the materials.	• The storage area shall be identified with minimal disturbance to the beach users, fishers and local public. • Communicate with fishers and providing them with advance notice of construction activities • Necessary warning signs/ boards of storage materials and heavy machinery, safety barricades shall be placed at necessary spots.
C.1.3 Planning for Traffic Changes	• Increased traffic during construction phase will disturb the other road users and the fish sales. • Air and noise pollution from the vehicles.	• The navigation path for the construction material shall be finalized in consultation with the representatives of the fisher's community. • Traffic Management Plan shall be implemented. It shall contain details such as diversions, if any; traffic safety arrangement during construction and precautions for transportation of materials. • Install speed limit signs around the construction zones and enforce low-speed limits for construction vehicles to reduce noise and dust generation.

The anticipated environmental impacts can be specific to certain environmental attributes with specific mitigation measures required for mitigating such impacts, in addition to the mitigation measures adopted in the pre-construction phase. The following sections describe the specific anticipated impacts and mitigation measures on land environment, water environment (surface water, groundwater and marine water), air environment, noise and vibration levels, ecology and biodiversity, occupational health and safety, socio-economic and cultural environment, climate and restoration & rehabilitation.

4.4.1 Land Environment

The anticipated impacts in the construction phase on the land environment and the corresponding mitigation measures to be adopted are depicted in Table 4.3.

Table 4.3: Anticipated Impacts & Mitigation Measures on Land from Construction

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
C.1 Activities with Impact on Land Environment		
C.2.1 Earth excavation and land clearance.	Excavation into the land and land clearance alters the structural stability and characteristics of the earth	• The excess excavated earth shall be used for filling the foundation trenches of harbour facilities. • Limit vegetation clearing to necessary areas.
C.2.2 Constructions near CRZ areas	Construction activities if undertaken without diligence, can lead various pollutants finding their way into the land.	• Construction in and near the water bodies shall be done as per the SOPs prepared. • The construction activities in and near water bodies shall be suspended during rough tides and heavy rains • The construction site shall be cleared of any debris/ construction waste and restored to its original state after completion of the construction activities
C.2.3 Contamination of sediment/soil due to leakage/ spillage of oil, construction spoils generated from construction.	• Leakage or spillage can cause land/ soil/ water pollution which will have serious repercussions on the soil quality. • Waste generated by construction workers	• The locations identified in the preconstruction/ design phase shall be used for the storage of construction equipment/barges, fuel, etc. • Designate impermeable storage for chemicals, establish runoff control and drainage systems. • Construction equipment shall be well maintained and refueled impervious platform with provision of garland channel to collect any oil and fuel spillage. • Waste oil and oil-soaked cotton/ cloth shall be stored in containers labeled ‘Waste Oil’ & ‘Hazardous’ and sold off to authorized vendors

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
		• Storage of empty and filled barrels/ drums of oil and fuel at earmarked area as per the Comprehensive Waste Management Plan. Empty barrels will be returned to authorized vendors. • Oil Spill containment kits (Including Absorbent Pads, Absorbent Socks, Disposable Bags, Safety Goggle etc.) shall be made available at site in order to manage any accidental spills on to land. • Biodegradable waste generated by the workers shall be managed using bio bins at the site. • Implement regular inspections and maintenance of fuel storage areas and spill kits on-site to handle accidental spillage promptly.
C.2.4 Coastal Protection	Impacts on the coastal area include: • Alteration of coastal landscape • Impacts on beach access • Land use conversion	• The construction of breakwaters for protecting shorelines, harbour, and coastal structures from the effects of waves and storm surges. • Implementation of beach reclamation and restoration programs post-construction. • Consult with the local fishing community to balance development needs with the preservation of the natural land used for fishing activities.

4.4.2 Water Environment (Surface, Groundwater and Marine water)

To identify the impacts on water environment, calculation of Water Quality Index (WQI) was done based on the monitored baseline data.

4.4.2.1. Water Quality Index

WQI was calculated using the monitored water quality parameters at surface water sampling location. The calculated WQI results are given in Table 4.4.

Table 4.4: WQI calculated as per the Water Quality Monitoring Results

Location Code	Calculated WQI	WQI Category
SW1	53.69	Medium

According to the standards of National Sanitation Foundation, USA in 1970, the WQI at monitored location indicate that the water quality was 'Medium' during the monitoring period. Therefore, necessary mitigation measures for the water environment shall be undertaken to maintain the quality of water.

4.4.2.2. Anticipated Impacts and Mitigation Measures proposed for Water Environment

The anticipated impacts in the construction phase on the water environment and the corresponding mitigation measures to be adopted are depicted in Table 4.5.

Table 4.5: Anticipated Impacts & Mitigation Measures on Water from Construction

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
C.2.1 Activities with impact on Surface Water		
C.2.1.1 Water requirement for construction	• Wastage of water • Drawing of excess fresh water	• Water for construction activities will be purchased in tankers. • Only required quantity of water shall be brought to site. • Best construction practices shall be adopted to minimize the water consumption such as reusing water for curing, etc. • Obtain necessary approvals for consumption of the water.
C.2.2 Activities with impact on Ground Water		
C.2.2.1 Sourcing of groundwater	• The proposed project falls in CRZ area, hence groundwater withdrawal result in salt water intrusion.	There shall not be any groundwater withdrawal from CRZ areas.
C.2.3 Activities with impact on Marine Water		
C.2.3.1 Construction activities leading to alterations to marine water flow	• Alteration to natural tidal pattern of the sea leading to erosion on the northern side of the proposed project	Well-designed breakwaters are proposed to avoid effects of erosion at the northern end of the beach.
C.2.3.2 Water Pollution from Construction Activities	The construction activities can pollute the marine water bodies: • Disposal of wastewater from construction activities into the sea • Leakages from machineries and vehicles leading to water pollution.	• No wastes shall be disposed into the sea. • Fuel storage and refueling sites to be at pre-designed impermeable storage location and kept away from the shoreline. • Oil Spill containment kits (Including Absorbent Pads, Absorbent Socks, Disposable Bags, Safety Goggle etc.) shall be made available at the site for immediate response to accidental spills. • Portable STP for management of wastewater generated by construction workers

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
	• Contamination due to surface water runoff of fuels, oils, etc. used for the construction activities • Disposal of construction wastes and other solid wastes • Wastewater generation by the construction workers • Increase in turbidity due to dredging.	• Drip pans shall be provided for the DG sets and other machineries. • All construction equipment/machinery shall be stored on paved or impermeable surface. • Waste oils and fuels shall be stored in closed cans, barrels, etc. • Refueling of machines/ vehicles/ equipment shall be done only at designated locations away from the shore • A detention tank shall be provided to collect surface runoff from the construction site and only overflow from this tank shall be discharged to water bodies or public drain. • Proper facilities for the source segregation and adequate management of solid waste shall be practiced at the construction site. • The turbidity levels during maintenance dredging should be measured and checked with the baseline as a reference. If turbidity spreads beyond the area earmarked for dredging, the operation should be suspended until baseline is attained.

4.4.3 Air Environment

To identify the impacts on air environment, calculation of Air Quality Index (AQI) was done based on the monitored baseline data.

4.4.3.1. Air Quality Index

AQI was calculated using the AQI Calculator available in the CPCB website. 24-hour average value of the monitored pollutants at each baseline ambient air sampling locations were taken while calculating the AQI. The calculated AQI results are given in Table 4.6.

Table 4.6: AQI Calculated as per the Baseline Ambient Air Quality Monitoring Results

Location Code	Calculated AQI	AQI Category
AQ1	69	Satisfactory
AQ2	63	
AQ3	74	

From the AQI calculations, it is observed that AQI at the baseline ambient air monitoring locations ranged between 63 – 74 during the monitoring period. AQI at all monitored locations indicate that the air quality was 'Satisfactory' according to the National Air Quality Index (NAQI). The AQI ranging

from 51 – 100 may cause minor breathing discomfort to sensitive people and therefore, necessary mitigation measures for the air environment shall be undertaken.

4.4.3.2. Anticipated Impacts and Mitigation Measures proposed for the Air Environment

The anticipated impacts in the construction phase on the air environment and the corresponding mitigation measures to be adopted are depicted in Table 4.7.

Table 4.7: Anticipated Impacts & Mitigation Measures on Air from Construction

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
C.3 Activities with impact on Air Quality		
C.3.1 Emissions due to construction activities	• Emissions from construction vehicles, machinery, equipment, DG sets, etc. • Burning of garbage and waste lead to air pollution, and discharge of highly toxic emissions • Fugitive dust emissions anticipated from unloading/ handling of construction material, storage of construction material, movement of vehicles over unpaved roads, etc. • Dust and emissions may persist at higher levels due to extended construction activities.	• Low-emission construction equipment shall be used for construction activities and they should be regularly maintained. • Construction equipment & vehicles shall be turned off when not used for extended period of time. • Regular maintenance of vehicles and use of vehicles with approved PUC • Adequate stack height shall be provided for DG sets. • The burning of garbage and waste shall not be permitted. • Dust barriers shall be used for dust from spreading.
C.3.2 Emissions due to transportation of construction materials	Air pollution due the movement of vehicles	• Regular maintenance of vehicles and use of vehicles with approved PUC • Dust barriers shall be used for dust from spreading • Transporting construction materials in covered vehicles • Unnecessary idling of construction vehicle shall be prohibited.

4.4.4 Noise and Vibration Levels

Noise generation during the construction phase will be due to the operation of machineries. The anticipated impacts in the construction phase on the noise levels the corresponding mitigation measures to be adopted are depicted in Table 4.8.

Table 4.8: Anticipated Impacts & Mitigation Measures on Noise Levels from Construction

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
C.4 Activities with impact on Noise and Vibration Levels		
C.4.1 Construction activities such as drilling, grinding etc.	Noise and vibrations from are anticipated from : • Operations and movements of construction equipment/ machinery and barges. • Unloading of material. • Construction activities Prolonged noise pollution causing disturbance to nearby communities and marine species	• All equipment, and machinery to be procured for construction confirming to the relevant Indian Standard (IS) norms and should be low noise machinery, as much as possible. • All vehicles deployed should have valid PUC and a record of the same shall be maintained. • All equipment used in construction shall strictly confirm to the MoEF&CC/ CPCB noise standards. • Vehicle and equipment inspection camps shall be conducted once in a year. • DG sets should be provided with acoustic enclosures. • Profile sheet barricades shall be provided around the proposed harbour facilities • Provide acoustic insulation and noise suppression around loud machinery. • Servicing of all construction machinery shall be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced. • Schedule high-noise activities to the day time only.

4.4.5 Ecology and Biodiversity

The anticipated impacts in the construction phase on ecology and biodiversity and the corresponding mitigation measures to be adopted are depicted in Table 4.9.

Table 4.9: Anticipated Impacts & Mitigation Measures on Ecology and Biodiversity

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
C.5 Activities with impact on Ecology and Biodiversity		
C.5.1 Construction of breakwater, pile driving, dredging etc. affecting Terrestrial/Aquatic flora/fauna and	• Refugee space for small fishes, crabs etc. may be affected • Reduced faunal abundance and diversity due to poor quality of water, caused by the seepage of pollutants.	• Trainings/ awareness sessions to workers about marine ecosystem and to prevent littering. • Immediate removal of construction debris and site clearance shall be done.

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
Avifauna (species and habitat)	• Oil spillage can lead to loss of life in fauna and reduced productivity of flora (eg. Hypothermia in sea dwelling creatures) • Impact of plastic wastes on fauna (e.g., birds, turtles, fishes etc.), which can cause starvation, loss of life, suffocation, reduced mobility etc. • Selection of unsuitable location and species for green belt development.	• Limit the construction work within proposed site and minimize use of land/ vegetation outside of the depicted construction area. • Proper solid waste management. • Safe disposal of oil, oily mixtures, and other residues. • Green belt development with suitable species to reduce the negative impacts due to construction phase.

4.4.6 Occupational Health and Safety

The anticipated impacts in the construction phase on occupational health and safety and the corresponding mitigation measures to be adopted are depicted in Table 4.10.

Table 4.10: Anticipated Impacts & Mitigation Measures on Occupational Health& Safety

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
C.6 Activities with Impact on Occupational Health and Safety		
C.6.1 Potable water	The workers should be provided with potable water, else it causes health risks to construction workers from contaminated water	• It shall be ensured that uncontaminated water is available for drinking • Potable water facilities shall be provided for the workers • Conduct periodic inspections to ensure potable water meets health standards.
C.6.2 Sanitation and Sewage System	Workers should be provided with sanitation and wastewater management systems, else it causes : • Unsanitary conditions at the site • Stagnation of wastewater leading to spread of disease carrying vectors.	The following shall be ensured: • Toilets shall be provided for the construction workers at the site • Adequate water supply is to be provided in all toilets and urinals • The sanitation facilities are to be cleaned and kept in a strict sanitary condition to maintain hygiene. • Portable STP for the treatment of wastewater.
C.6.3 Safety of Workers and accident	The lack of adequate safety measures/training/PPEs causes	• The construction workers shall be given adequate training on HSE policy, Emergency Response and Disaster Management Plan (ERDMP), SOPs for construction, etc.

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
risk from construction activities	• Accidents like falling from heights, into the sea, etc. affecting lives and property • Non-compliance to safety regulations. • Sunburn • Weather related calamities. • Increased risk of accidents due to unattended and properly demarcated unfinished areas.	• Appoint a dedicated on-site Health, Safety and Environment (HSE) officer to oversee daily activities and ensure that safety protocols are followed rigorously • The workers should be trained to ensure the use of appropriate PPE depending on the task. All PPE should be checked regularly and before use. Routine trainings to be conducted. • Imposing strict rules and procedures for the execution of specific tasks, enforcement of the applicable Acts and Rules on workforce welfare and compensation. • Appropriate lighting shall be provided if any constructions are undertaken during the night. • Proper caution signage, barricading etc. shall be installed at construction zone. • Trespassing of the local public into the construction site shall be restricted to prevent accidents. • All the construction activities shall be suspended during heavy rains. • Establishment of early warning systems shall be proposed to minimize the effect of such natural calamity in the future. • First aid facilities with adequate number of first-aid-trained staff should be available at site. Tie up with nearest hospital or health care center shall be established to manage an emergency. • Providing water ambulances near/ in the proposed construction site for immediate use. • Medical check-up camps for workers, shall be arranged once in six months.

4.4.7 Socio-economic and Cultural

The anticipated impacts in the construction phase on socio-economic and cultural environment and the corresponding mitigation measures to be adopted are depicted in Table 4.11. No land acquisition performed for the project; therefore, there is no requirement of R&R Plan.

Table 4.11: Anticipated Impacts & Mitigation Measures on Socio-economic & Culture

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
C. 7 Activities with Impact on Socio-Economic and Cultural Environment		
C.7.1 Risk to local community/ public	• Inconvenience to the public from air, noise, water, and soil pollution, especially due to the constructions • Potential interruption of local fishing and access for the community.	• All mitigation measures suggested for preventing air, noise, water, and soil pollution shall be scrupulously followed. • Coordinate with fishing communities, provide alternate access routes, and regularly update community on progress. • Inform the local population prior to the commencement of construction activities through visual and print media. • Grievance redressal system shall be established for the public and it should be ensured that the grievances are addressed in a prompt and sustainable manner. • The siting criteria for construction equipment/ machinery/ storage locations/ casting yards etc., shall be scrupulously followed. • Heavy noise generating activities shall be scheduled during day time
C.7.2 Traffic management	Inconvenience to the public due to the traffic congestion.	• A prescribed time period for the movement of trucks or restricting their movement during the rush hours (early morning, evening school and office hours). • Communicate with local communities, schedule activities to minimize disruption.

4.4.8 Climate (Microclimate and Macro-climate)

The anticipated impacts in the construction phase on the climate change and the corresponding mitigation measures to be adopted are depicted in Table 4.12.

Table 4.12: Anticipated Impacts & Mitigation Measures on Climate from Constructions

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
C.8 Activities with impact on Climate Change		
C.8.1 Greenhouse gases (GHG) emissions	Minor microclimate impact due to: • Operations of various construction equipment/	• Fuel efficient equipment/ machineries/ other electrical devices shall be used for the construction activities. • Trip scheduling shall be adopted for the construction materials

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
	machinery and other construction activities • Transportation of construction material • Power consumption	• Shuttle bus services shall be provided for the construction workers. • LED lights shall be used for all lighting requirements. • Stick to the construction schedule and minimize extending duration of activities to reduce impact. • Establish green belts or plant buffers around the site to reduce impacts on the microclimate.

4.4.9 Clean up Operations, Restoration and Rehabilitation

The anticipated impacts in the construction phase from the clean-up operations and the corresponding mitigation measures to be adopted are depicted in Table 4.13.

Table 4.13: Anticipated Impacts & Mitigation Measures for the Clean-up Operations

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
C.9 Clean-up Operations, Restoration and Rehabilitation		
C.9.1 Clean-up Operations, Restoration and Rehabilitation	• Environment degradation • Safety hazards and inconveniences to the local population	• The clean-up and restoration operations are to be implemented, prior to demobilization. • All construction zones including the breakwaters, and harbour area shall be cleaned up. • Coordinate with local environmental agencies to ensure that cleanup efforts meet or exceed regulatory standards, and restore native vegetation to disturbed areas to promote ecosystem recovery.

4.5 Anticipated Impacts and Mitigation Measures during the Operation Phase

The project is proposed as a solution for the pressing needs of the local fishers caused by the migratory river mouth and insufficient fish landing facilities. The following sections describe the specific anticipated impacts and mitigation measures on land environment, water environment (marine water, surface water and groundwater), air environment, noise and vibration levels, ecology and biodiversity, occupational health and safety, socio-economic and cultural environment, climate and restoration & rehabilitation.

4.5.1 Land Environment

The anticipated impacts in the operation phase on the land environment and the corresponding mitigation measures to be adopted are depicted in Table 4.3.

Table 4.14: Anticipated Impacts & Mitigation Measures on Land from Operations

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
O.1 Activities with Impact on Land Environment		
O.1.1. Probability of erosion on south of project site and increased sedimentation	• Loss of beach land • Effects on structural stability of existing and proposed structures • Altered coastal landforms and erosion patterns.	• Regular monitoring of land erosion and deposition patterns shall be done by continuous shoreline mapping by HED and additional mitigation measures shall be adopted as required. • Implement coastal management strategies to preserve beach areas. • If the erosion on the south side of the proposed fishing harbour is progressive after the development, then a suitable shore protection measure in the form of a seawall or series of groynes may be provided as per the suggestions of CWPRS.
O.1.2. Contamination of land with solid/liquid waste and land degradation	• Disposal of untreated solid and liquid waste from harbour onto land can cause soil contamination. • Increased foot traffic, waste accumulation degrades land.	• Implement a waste management plan, designate waste disposal areas, conduct regular maintenance on landside facilities of the harbour. • Garbage bins shall be provided in the site and ensure that these are regularly emptied and disposed in a hygienic manner. • On-site decomposition of biodegradable waste shall be adopted with the help of aerobic composting bins. • All recyclables shall be handed over to respective recyclers. • All other non-biodegradable wastes shall be handed over to authorized waste handlers. • ETP of 15 kLD will be provided at the harbour. • The proposed ETP shall be regularly inspected and maintained. • Ensure workers are trained on proper waste segregation to enhance compliance with disposal standards.
O.1.3 Leakage/ spillage of hazardous waste	• Spillage/ leakage of oil, diesel etc. from vehicles and equipment.	• Fuel used for machineries/ fishing vessels shall be stored in designated area having impervious paved floor and waste oil shall be stored in barrels. • The machineries used at site for the fish handling shall be regularly inspected and maintained. • Waste oil from DG sets or other equipment shall be disposed through authorized dealers as per the

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
		Hazardous and Other Waste (Management & Transboundary Movement) Rules, 2016.

4.5.2 Water Environment (Marine, Surface and Groundwater)

The anticipated impacts in the operation phase on the water environment and the corresponding mitigation measures to be adopted are depicted in Table 4.5.

Table 4.15: Anticipated Impacts & Mitigation Measures on Water from Operations

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
O.2 Activities with impact on Water Environment		
O.2.1 Increased water requirement at the harbour facilities.	• Stress on the fresh water source due to over exploitation and wastage of water • Withdrawal of groundwater from CRZ areas.	• It is proposed to install RWH tanks of 50 kL at the harbour. • The treated water from the ETP shall be reused for landscaping area. • Additional water requirement than the stored water from the pump house and identified open well shall be met from water purchased via tankers. • Withdrawal of groundwater shall be strictly prohibited in CRZ areas. • Install water-saving fixtures in harbour restrooms and fish handling areas to optimize water use and further reduce demand.
O.2.2 Contamination of the waterbody	• Spillage of fuels from mechanized boats • Disposal of waste nets, etc. by fishers into the sea • Disposal of wastewater into the waterbody.	• Fishers shall be given awareness on conservation of environment, keeping their boats and equipment clean, etc. • Fuel used for machineries shall be managed as per the Hazardous and Other Waste (Management & Trans boundary Movement) Rules, 2016. • Untreated wastewater shall not be disposed to the waterbody. • Provide dedicated disposal bins near berthing areas to encourage fishers to dispose of nets and waste properly, rather than into the sea.
O.2.3 Storm water management	• Contamination of waterbody due to direct runoff from	• Detention tank shall be provided before letting the storm water in the drain from discharging into the waterbody.

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
	landside facilities of the harbour into the waterbody • Water logging can occur if adequate provisions for drainage is not provided. • Altered coastal hydrodynamics affecting marine ecosystems. • Changes in sedimentation patterns may affect water quality in nearby water bodies.	• The drains and detention tanks shall be desilted and maintained regularly, especially before the onset of monsoon.

4.5.3 Air Environment

The anticipated impacts in the operation phase on the air environment and the corresponding mitigation measures to be adopted are depicted in Table 4.16.

Table 4.16: Anticipated Impacts & Mitigation Measures on Air from Operations

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
O.3 Activities with impact on Air Quality		
O.3.1 Emissions due to movement of vehicles and working of machinery	• Air pollution due the emission from vessels and trucks due to inadequate berthing, parking and movement facilities. • Deterioration of the quality of the access road. • Emissions from DG sets (backup power source) and other machineries.	• Only vehicles having valid PUC shall be allowed into the harbour. • The internal road and parking areas of the harbour shall be regularly maintained. • DG sets shall be installed as per CPCB guidelines and shall have adequate stack height. • Regular equipment & vehicle emission inspection program and incentivize staff to use low-emission vehicles or carpool to the harbour.

4.5.4 Noise and Vibration Levels

The anticipated impacts in the operation phase on the noise and vibration levels and the corresponding mitigation measures to be adopted are depicted in Table 4.8.

Table 4.17: Anticipated Impacts & Mitigation Measures on Noise & Vibration

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
O.4 Activities with impact on Noise and Vibration Levels		
O.4.1 Increased noise levels in the harbour premises	Generation of Noise Level due to: • Increased movement of fishing vessels and other operational activities • Movement of trucks to the harbour • Functioning of equipment and DG sets	• Acoustic enclosures for DG Sets and other noise generating machineries as per CPCB guidelines shall be provided • Proper lubrication, muffling and modernization of equipment shall be used to reduce the noise during operation phase. • Vehicle and equipment inspection camps shall be conducted to ensure that they are operating as per the prevailing norms for controlling pollution.

4.5.5 Ecology and Biodiversity

There will not be any adverse impact on terrestrial ecology during operation phase of the project. The anticipated impacts in the operation phase on the marine ecology and biodiversity and the corresponding mitigation measures to be adopted are depicted in Table 4.9.

Table 4.18: Anticipated Impacts & Mitigation Measures on Ecology and Biodiversity

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
O.5 Activities with impact on Ecology and Biodiversity		
O.5.1 Increased movement of fishing vessels	• Long-term habitat changes due to breakwater and altered sedimentation patterns may threaten local marine species. • Increased movement of fishing vehicles threatening the habitat degradation/ fragmentation of marine organisms. • Loss/ disturbance to breeding, nesting, spawning areas	• Fishing vehicles shall be anchored at designated nearest feasible location. • Designate specific routes for marine vessels to reduce the risk of accidental collisions with sensitive habitats. • Impose speed restrictions in areas where marine life is concentrated to minimize disturbances.
O.5.2 Over exploitation of fishes and	Stress on the number and species of fishes available in the sea.	• Awareness trainings shall be given to fishers about the latest state-of-the-art fishing methods to avoid

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
other organisms in the sea		trapping of species that need environmental protection and against overfishing. • Coordinate with local fisheries organizations to promote and support programs for sustainable fishing practices. • Temporary bans on fishing during breeding or migratory periods.
O.5.3 Introduction of non-native species into the local ecosystem	Invasive species can disrupt the balance of the local marine ecosystem, potentially leading to the decline or extinction of indigenous species.	Establish regular monitoring and inspection programs to detect invasive species early and implement rapid response actions to eradicate them before they become established.
O.5.4 Green area development	• Selection of unsuitable location and species for green area development. • Lack of maintenance of green area	• The species for green area development shall be selected in consultation with locals. • Develop a long-term green area maintenance plan with community involvement to ensure sustainable growth and restoration of these green belt areas.

4.5.6 Occupational Health and Safety

The anticipated impacts in the operation phase on occupational health and safety and the corresponding mitigation measures to be adopted are depicted in Table 4.10.

Table 4.19: Anticipated Impacts & Mitigation Measures on Occupational Health & Safety

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
O.6 Activities with Impact on Occupational Health and Safety		
O.6.1 Sewage disposal system and sanitation	• Contamination of drinking water sources • Inadequate sanitation and wastewater management systems • Spread of waterborne communicable diseases • Mosquito/ pests menace	• Adequate sanitation facilities for workers with adequate water supply are proposed along with resting rooms at the harbour, which shall be cleaned and kept in a safe sanitary condition. • HSE in charge of HED shall be appointed for conducting daily inspections regarding the safety and hygiene conditions at the harbour.

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
O.6.2 Solid Waste Disposal	The lack of solid waste management systems causes: • Environmental pollution • Unhygienic conditions and menace of stray dogs/ pests • Risks of spread of communicable diseases.	• Source segregation and management of solid waste. • The harbour premises shall be kept in good conditions and measures to control pest shall also be undertaken. • Regular inspections should be conducted to ensure compliance with waste management practices, and staff should receive training on waste disposal to minimize environmental pollution.
O.6.3 Accident risk from fishing in the sea and daily operations.	The lack of adequate safety measures/ training/ PPEs causes • Accidents affecting lives and property. • Harm to life of fishers due to failure of equipment. • Unable to return safely on time to the harbour	• Accurate warning systems shall be provided to warn the fishers about the weather/ environmental conditions. • Fishers shall be provided training and instructions to wear adequate PPE. • Fishers shall also be instructed to obtain appropriate insurances. • Enough staff trained in first aid measures and all necessary facilities shall always be deployed at the harbour. Safety trainings, maintaining first-aid kits of adequate numbers and emergency response facilities, and provide continuous PPE access. • Periodic medical check-ups for the fishers and the workers at the harbour shall be conducted.

4.5.7 Socio-economic and Cultural

The anticipated impacts in the operation phase on socio-economic and cultural environment and the corresponding mitigation measures to be adopted are depicted in Table 4.11. No land acquisition performed for the project; therefore, there is no requirement of R&R Plan.

Table 4.20: Anticipated Impacts & Mitigation Measures on Socio-economic & Culture

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
O. 7 Activities with Impact on Socio-Economic and Cultural Environment		

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
O.7.1 Inadequacy of facilities provided in the harbour	Influx of large number of customers to the landside facilities of the harbour creating rush at the harbour and large competition for the local customers.	• The adequacy of the landside facilities shall be evaluated from time to time. The facilities shall be augmented as per requirement. • Create visitor guidelines and install information boards to educate visitors on best practices to minimize their impact on harbour operations.
O.7.2 Traffic management	Inconvenience to the local public due to the increased movement of trucks used for transportation of fishes to the nearest market and customers.	• Traffic Management Plan shall be prepared and scrupulously followed. • Traffic warden shall be appointed in order to maintain traffic inside the harbour. • Vehicular trips for the transportation of fishes shall be scheduled to ensure smooth flow of traffic and shall not cause inconvenience to local public.

4.5.8 Climate (Microclimate and Macro-climate)

The anticipated impacts in the operation phase on the climate change and the corresponding mitigation measures to be adopted are depicted in Table 4.12.

Table 4.21: Anticipated Impacts & Mitigation Measures on Climate from Constructions

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
O.8 Activities with impact on Climate Change		
O.8.1 Activities with emissions of Greenhouse gases (GHGs)	GHG emissions from • Power requirement for the harbour operations • Operations of various equipment/ machinery • Truck movement for transportation of fishes to nearby markets and customers.	• Solar panels of capacity 30 kW are proposed to meet the power requirement of the harbour. • Smart energy management systems are proposed be used to monitor and optimize energy use in real-time, reducing overall GHG emissions. • Fuel efficient and star-rated equipment/ machineries/ other electrical devices shall be used for the operations, wherever applicable. • Only vehicles with valid PUC shall be allowed into the harbour.
O.8.2 Alter local microclimates	• Alter local microclimates through heat island effects (higher	• Increasing and maintaining vegetation and green areas.

Aspect	Anticipated Environmental Impacts	Mitigation Measures Proposed
through heat island effects	temperatures due to infrastructure and reduced vegetation). • Affect coastal weather patterns, exacerbating local temperature increases.	• Ensure regular maintenance of green spaces to maximize vegetation health and improve their effectiveness in cooling local microclimates.

4.6 Conclusions

From the above, it can be concluded that, the impacts due to the construction and operations of the harbour can be mitigated if appropriate management measures are implemented. There is a combination of project features that contribute in lowering anticipated impacts, which are:

- CWPRS has designed the breakwaters for the harbour and for river training works in accordance with modelling studies using the site-specific data and optimising the design as per the suggestions of HED after conducting necessary desk studies, for maximum efficient control over river mouth migration and for providing tranquil conditions in the harbour basin.
- The landside facilities of the harbour are proposed within the existing land of the harbour, which is under the possession of HED and therefore there is no requirement for land acquisition.
- The project includes environmental management measures such as wastewater treatment plant, improved stormwater drainage, rainwater harvesting, upgraded internal roads and expanded parking facilities.
- No tree cutting is proposed for the project and to improve the ecosystem, green area development and landscaping is included in the project.

Chapter 5 Analysis of Alternatives

5.1 No Project Scenario

The project is essential to address numerous challenges faced by local fishermen. The existing fish landing centre is inadequate, and the dynamic nature of the Chithari River mouth, characterized by sandbar formation and shifting channels, poses significant risks to both fishermen and property.

Without the proposed infrastructure improvements, the region will continue to face numerous challenges. Fishermen will remain exposed to safety risks, including accidents and economic losses due to damaged equipment and limited access to safe landing and berthing facilities. From an economic perspective, the absence of a dedicated harbour facility will limit the region's growth potential.

In conclusion, the "No Project" scenario could have severe consequences, emphasizing the urgent need for the implantation of the project.

5.2 Analysis of Alternative Site

The proposed site is almost equidistance from the existing harbours at Cheruvattur (17 km towards the south of project site) and Kasaragod (17 km towards north of project site). The site already has existing fish landing centre, auction hall, net mending shed, and toilet block and has the potential to be developed as harbour and hence no other site was considered for the development of harbour.

5.3 Analysis of Alternatives Design for Breakwaters

Various design and structural alternatives were evaluated to optimize the design of breakwaters.

The breakwater was initially designed with a 7 m wide, 0.5 m thick crest slab and a 0.5 m thick parapet wall. The seaward side of the breakwater has 2 T and 6 T tetrapod armour units, while the leeward side was armoured with lighter stones, ranging from 0.5 to 1 T and 1 to 2 T stones. The core constructed using 20–50 kg stones with a 0.3 m thick bedding layer of 20 kg stones comprised of 20–100 kg stones, supported by a 0.3 m thick bedding layer of 20 kg stones. The roundhead has 8T tetrapod on a 1:2 slope, supported by a 6 m wide toe berm made of 3– 4T stones, and included an 8 m wide carriageway for operational access.

Based on further refinements, the final design made minor modifications to improve cost-efficiency and structural performance. The crest width for the trunk section was reduced from 7.0 m to 5.5 m, while the roundhead crest width remained 8.0 m. For the -2.0 m bed level, the lee-side armour slope was adjusted to 1:1.5, and a toe berm composed of 0.5–1T stones was added at elevation +0.2 m. Similarly, for the -4.5 m bed level, the lee-side armour used 1–2T stones at a 1:1.5 slope, with a toe berm made of 1–2T stones at elevation -2.55 m. The roundhead toe berm was also adjusted, now composed of 3–4T stones placed at elevation -0.7 m. All other features of the initial design, including the materials, sea-side armour slopes, and bedding layers, were retained.

The initial design offered robust protection, with wider crest dimensions providing enhanced operational safety and hydraulic stability. However, the modifications in the final design optimized material usage, reducing costs while maintaining structural integrity.

Chapter 6 Environmental Monitoring Program

Environmental monitoring shall be carried out at the selected locations to assess the environmental quality which are useful for the following.

- To verify the predictions on environmental impacts.
- To ensure the proper implementation of suggested mitigation measures.
- To comply the requirements of environmental regulatory framework.
- To suggest for improvements or modifications in the Environment Management Plan.

Environmental Monitoring Program (EMoP) includes the performance monitoring for environmental attributes such as ambient air, noise levels, soil, surface water, groundwater, marine water etc. In order to protect the environment, manage and control pollution; monitoring systems and budgetary provisions would be required.

6.1 EMoP for Construction Phase

The EMoP for the construction phase shall be under the scope of the construction contractor. EMoP for the construction phase of the project is summarized in Table 6.1.

Table 6.1: EMoP for Construction Phase

S. No	Environment Component	Frequency of Monitoring	No. of Locations*	Compliance to Standards
1.	Ambient Air	24 hourly continuous monitoring twice in a year except monsoon	3	NAAQS, 2009
2.	Noise Levels	Day - 6 AM to 10 PM & Night -10PM to 6AM (24 hourly continuous monitoring) Once in every 6 months	3	Noise Pollution (Regulation & Control) Rules, 2000
3.	Marine Water Quality	Once in every 6 months	2	--
4.	Marine Sediments		2	--
5.	Surface Water		1	Surface Water Quality Standard based on Classification for Surface Water as per CPCB Guidelines
6.	Soil		1	--
** Locations for environmental monitoring shall be same as baseline environmental monitoring locations given in Chapter 3*				

The budgetary estimate of EMoP for construction phase is detailed in Table 6.2.

Table 6.2: Budgetary Estimate of EMoP for Construction Phase

S. No.	Particulars	No. of locations	Rate per location (INR)	No. of samples/year	Total Amount (INR)/ year
1.	Ambient Air	3	16,000	2	96,000
2.	Noise levels	3	7,000	2	42,000
3.	Marine water	2	8,000	2	32,000
4.	Marine sediment	2	10,000	2	40,000
5.	Surface water	1	8,000	2	16,000
6.	Soil	1	10,000	2	20,000
EMoP Budget for Construction Phase					**2,46,000**

6.2 EMoP for Operation Phase

The EMoP for the operation phase shall be under the scope of the HED. The budgetary estimate of EMoP for operation phase of the project is summarized in Table 6.3.

Table 6.3 Budgetary Estimate of EMoP for Operation Phase

S. No	Environment Component	Frequency of Monitoring	No. of Locations*	Compliance to Standards
For Environmental Aspects				
1.	Ambient Air	24 hourly continuous monitoring twice in a year except monsoon	3	NAAQS, 2009
2.	Noise Levels	Day - 6 AM to 10 PM & Night -10PM to 6AM (24 hourly continuous monitoring) Once in every 6 months	3	Noise Pollution (Regulation & Control) Rules, 2000
3.	Marine Water Quality	Once in every 6 months	2	-
4.	Marine Sediments		2	-
5.	Surface Water		1	Surface Water Quality Standard based on Classification for Surface Water as per CPCB Guidelines
6.	Soil		1	-
Environmental Monitoring for Project Facilities				
Proposed facilities				
1.	Inlet and outlet water from ETP	Once in every 6 months	2	-
2.	Stack Emissions		1	-
** Locations for environmental monitoring for Environmental Aspects shall be same as baseline environmental monitoring locations given in Chapter 3*				

The budgetary estimate for EMoP for operation phase is detailed in Table 6.4.

Table 6.4: Environment Monitoring Budget for Operation Phase

S. No.	Particulars	No. of locations	Rate per location (INR)	No. of samples/year	Total Amount (INR)/ year
For Environmental Aspects					
1.	Ambient Air	3	16,000	2	96,000
2.	Noise levels	3	7,000	2	42,000
3.	Marine water quality	2	8,000	2	32,000
4.	Marine sediment	2	10,000	2	40,000
5.	Surface water quality	1	8,000	2	16,000
6.	Soil quality	1	10,000	2	20,000
For Project Facilities: Proposed Facilities					
7.	Inlet and outlet water from proposed ETP	2	8,000	2	32,000
8.	Stack Emissions from DG sets	1	3,500	2	7,000
EMoP Budget for Operation Phase					**2,85,000**

The estimated cost for environmental monitoring during construction phase is **INR 2.46 Lakhs/year** and operation phase is **INR 2.85 Lakhs/year**. The monitoring of selected parameters for each half-year period shall be implemented through approved NABL Accredited Monitoring Agency.

Chapter 7 Additional Studies

7.1 Public Hearing

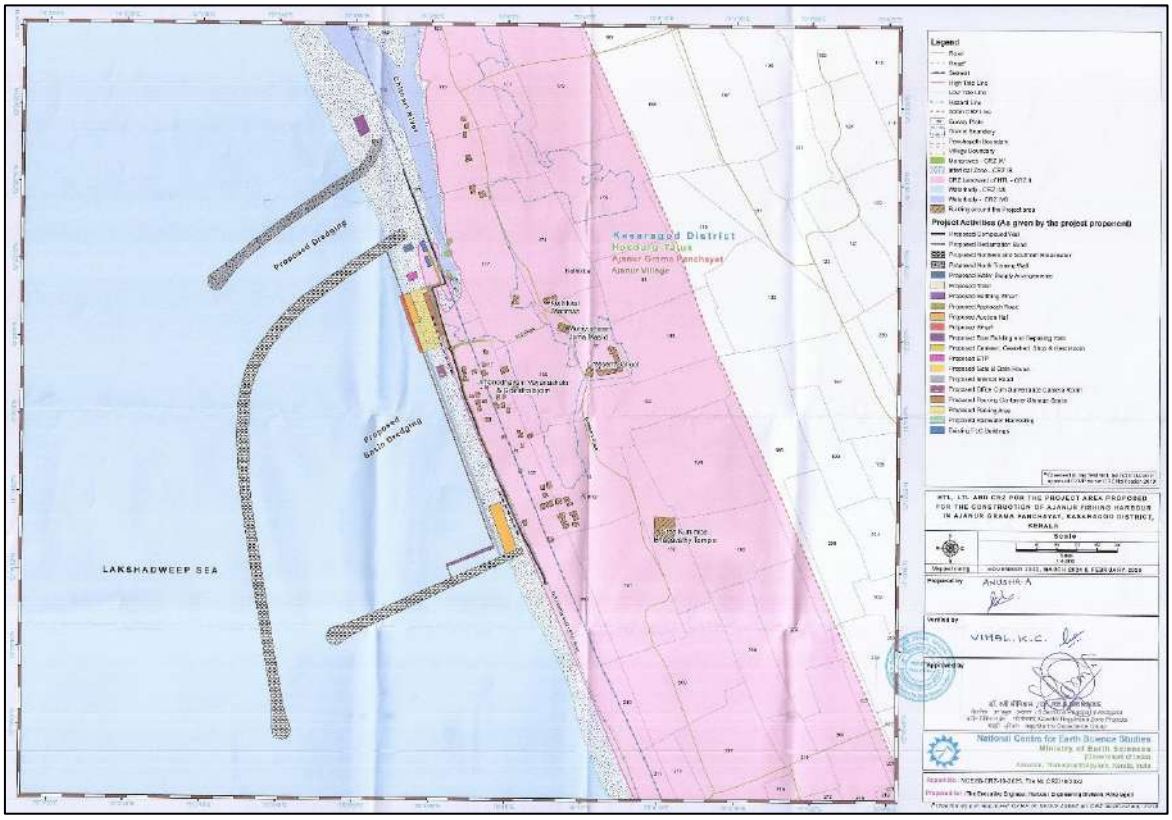
This project does not require public hearing as it is a standalone CRZ project.

7.2 Social Impact Assessment and R&R Action Plan

The existing social condition in the study area is detailed in section 3.10 of chapter 3 and the anticipated impacts on social environment and the mitigation measures suggested are detailed in section 4.4.7 and section 4.5.7 of chapter 4. Land acquisition is not involved for the proposed project and hence R&R action plan is not applicable.

7.3 HTL/LTL Demarcation

Detailed HTL/LTL demarcation studies for the project were conducted by National Centre for Earth Science Studies (NCESS), Thiruvananthapuram in accordance with CRZ notification, 2019. NCESS has prepared the CRZ Status Report and the HTL/LTL map in 1:4000 scale superimposing the project layout. The CRZ map for the proposed project prepared by NCESS is shown in Figure 7.1.



Source: CRZ Status Report

Figure 7.1: CRZ Map prepared by NCESS

As per the CRZ mapping, the proposed project falls within CRZ IA (Mangroves), CRZ IB (Intertidal Zone), CRZ II, CRZ-IV A (Lakshadweep Sea) and CRZ-IV B (Chithari River). Proposed construction of compound wall of 16.48 m falls within CRZ IA. HED decided not to proceed with the construction

of compound wall within CRZ IA. Other ecologically sensitive areas such as turtle nesting grounds or structures of archaeological importance and heritage sites, etc., which are categorised as CRZ IA, are not found in the project area or in its close proximity. The majority of the proposed project site is situated on the CRZ-IV A (Lakshadweep Sea), as per the CZMP map of Kerala. As per the clauses (i) & (ii) of section 5.1.2, (i) of section 5.2 and (ii) & (iii) of 5.4 of CRZ notification 2019, proposed activities are permissible in CRZ areas. The details of the proposed project site in CRZ area are given in Table 7.1.

Table 7.1: CRZ Details of Proposed Harbour

CRZ Zone	Length (m)	Area (m^2)
CRZ IA	16.48	-
CRZ IB	187.68	11,181.91
CRZ II	719.08	3,636.97
CRZ IVA	749.14	44,911.33
CRZ IVB	-	94.60
Total	**1,672.38**	**59,824.81**

Source: CRZ Status Report

7.4 Mathematical Modelling Studies

The CWPRS, Pune, conducted mathematical modelling studies to assess the hydrodynamics and siltation of the fishing harbour project. Although model studies were previously carried out at the same project site by CWPRS in 2016, the HED proposed a revised layout considering the future expansion of the project. As a result, new modelling was conducted in 2024. The main objective of the modelling study was to evaluate the hydrodynamic and siltation changes after the proposed construction of fishing harbour and river training works. The analysis was based on bathymetric data of the area, tidal data, grain size data, suspended sediment concentration and river discharge collected in March 2023 from both the river region and offshore regions.

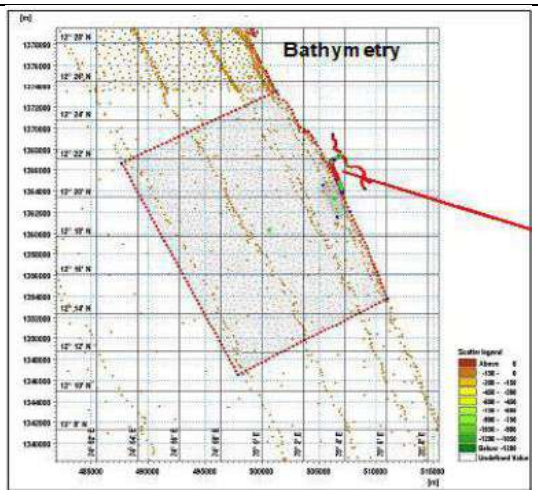
A two-dimensional hydrodynamic model MIKE-21 HD using Flexible Mesh, was used to study the hydrodynamics, while MIKE-21 MT module was used for sediment transport studies in both the existing and the proposed scenarios under prevailing tidal and wave conditions. The calibration of the model was done with the existing site conditions of the year 2023.

The key findings from the model studies include:

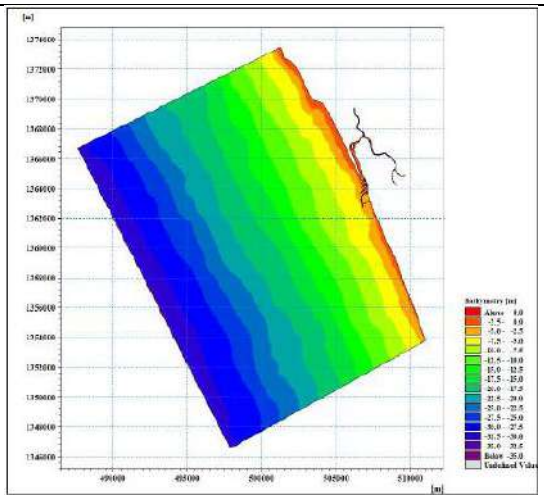
- Under the existing conditions, during monsoon season the Chithari River experiences increased water flow, which carries away sediments that had accumulated during the non-monsoon season. The estimated maximum deposition of about 0.1 m in a year over the computational domain is obtained. The annual sedimentation estimated at the river mouth is about 0.021 m.
- For the proposed conditions, there is a slight increase in deposition during the monsoon season at the river mouth and below the southern breakwater as compared to non-monsoon season. The annual sedimentation rate is estimated to be 0.03 m in the Fishing Harbour, 0.05 m near the north and south breakwaters of the proposed development, and 0.045 m at the river mouth. The increased sedimentation near the breakwaters is primarily caused by local water circulation patterns.

Compared to the existing conditions, there is a slight increase in sedimentation near the river mouth region for the proposed condition for the proposed scenario. This minor increase is attributed to decrease in currents resulting from dredging in the proposed area. Modelling studies indicate a decrease in current speeds across most of the study region for the proposed layout.

- The littoral drift at this study area under the existing condition was carried out by CWPRS in the year 2016. The study quantified the annual sediment transport along the coastline; the southward transport is observed to be of 0.531 Mm^3 and a northward transport to be 0.118 Mm^3. This results in a net southward transport of 0.413 Mm^3, indicating a significant movement of sediment towards the south.
- The proposed development is likely to influence the shoreline. Littoral drift is expected to cause accretion on the northern side and erosion on the southern side. The shoreline evolution after 10 years is predicted, the northern side is expected to experience accretion, extending 2,500 m along the coast and 68 m seaward and the southern side is projected to erode, with a potential loss of 1500 m along the coast and 40 m in cross-shore direction. It is observed that the shifting of the river mouth is about 200 m towards the north over a year.
- The bathymetric data for the offshore region and nearshore region was obtained from hydrographic charts provided by HED. Water level depth data over the estuary and river areas was obtained using the Acoustic Doppler Current Profiler (ADCP) of CWPRS. These water level measurements were subsequently utilized to estimate bathymetry before and after the construction of the breakwaters and the same is shown in Figure 7.2.



Bathymetry without the proposed layout



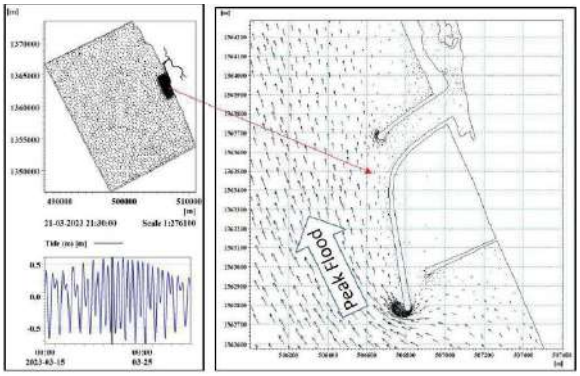
Bathymetry with the proposed layout

Source: Mathematical Model Studies to Assess Hydrodynamics and Siltation due to Construction of Fishing Harbour at Ajanur, Kerala, by CWPRS.

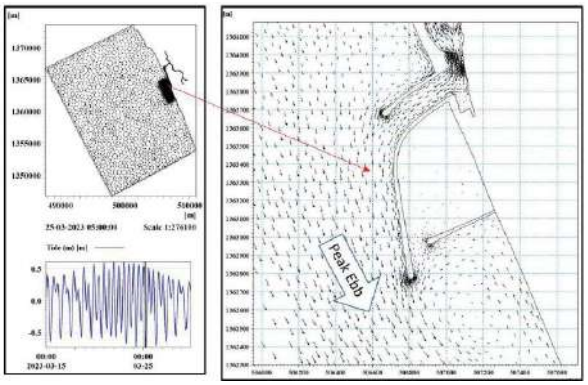
Figure 7.2: Bathymetry model for the project site

- During non-monsoon season, it is observed from the flow fields that circulation is formed near south breakwater during ebbing phase of tide. However, during monsoon season, circulation is formed near south breakwater (during flooding and ebbing phase of tide). In addition, during flooding phase, circulation is formed at 2 other locations near north breakwater and entrance of river mouth also.

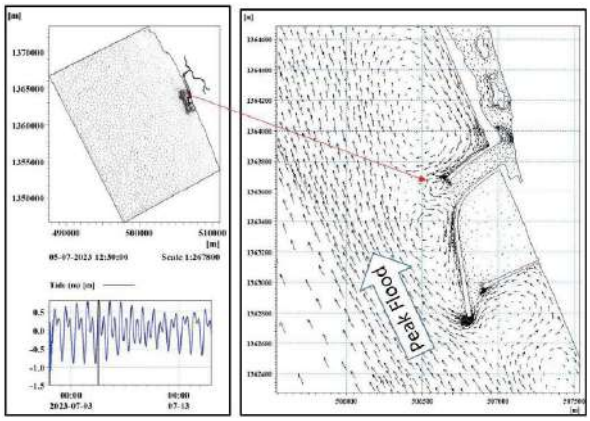
Though eddies formed around the circulation are weak, its intensity may change according to changes in local climate. Furthermore, four points t1, t2, t3 and t4 called as monitoring stations are considered for assessment of changes in currents after construction of proposed layout. The images showing the same are given in Figure 7.3.



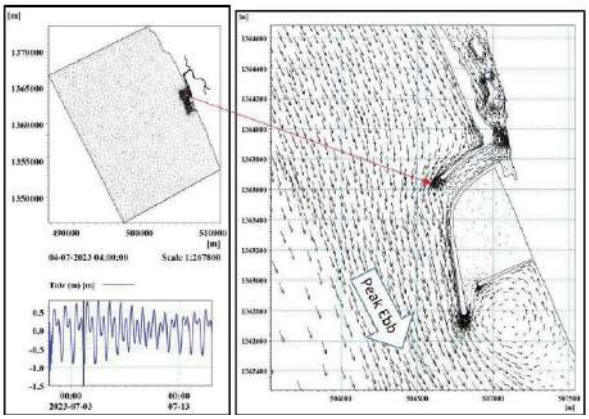
Flow field during peak flood - Non-monsoon



Flow field during peak ebb - Non-monsoon



Flow field during peak flood - Monsoon



Flow field during peak ebb - Monsoon

Source: CWPRS Modelling Report

Figure 7.3: Flow field for Proposed Condition

- There will be an increase in the magnitude of currents at the river mouth (T1) from 0.007 m/s to 0.1 m/s during the non-monsoon season and from 0.015 m/s to 0.3 m/s during the monsoon season. However, the magnitude of the current at the end of the river training breakwater (T2), at the harbour entrance (T3) and inside the harbour (T4) will significantly reduce after the proposed development. During the non-monsoon season, the peak modelled currents at T2, T3 and T4 for existing conditions are 0.43 m/s, 0.38 m/s, and 0.39 m/s respectively. After the proposed development the currents at these three monitoring stations will be reduced to 0.11 m/s, 0.06 m/s, and 0.008 m/s. During the monsoon season, the peak modelled currents at T2, T3 and T4 for existing conditions are 0.55 m/s, 0.46 m/s and 0.49 m/s respectively. After the proposed development, the currents at T2, T3 and T4 will be reduced to 0.21 m/s, 0.11 m/s, and 0.003 m/s respectively.

The capital dredging in the fishing harbour area, in the river mouth and along the river is calculated to be about 1.1 Mm^3.

Recommendation suggested by CWPRS after the modelling study are:

- The study suggests a proposed layout consisting of 1,150 m long north breakwater, 425 m long south breakwater and 435 m breakwater as a river training work near the mouth of Chithari river.
- If the shifting of the river mouth is significant even after the proposed development of the river training works then a seawall of appropriate length may be. Similarly, if the erosion on the south side of the proposed fishing harbour is progressive after the development, then a suitable shore protection measure in the form of a seawall or series of groynes may be provided.
- Maintenance dredging should be carried out near the river mouth and at the harbour entrance to maintain the desired depth for smooth movement of marine vessels.

Based on the model results, the proposed layout of the training works and the harbour basin, along with dredging activities, is found to be suitable for the prevailing conditions at the site.

7.5 Wave Flume Study

The desk and wave flume studies have been carried out by CWPRS, Pune to evolve the design cross-section of breakwater. For the design of the breakwater, a water level of 2.60 m was considered as the Design Water Level (DWL), which is 1.20 m above the Mean Higher High Water (i.e., Storm Surge of 0.80 m + Sea level rise of 0.40 m). The significant wave height of 4.0 m was considered for the design of breakwater. The key findings of the study include the following:

- The design of the breakwater includes tetrapod in the armour, a 7 m wide and 0.5 m thick crest slab, and a 0.5 m thick parapet wall with the end of the breakwater protected by a proper roundhead.
- The cross section of the trunk portion of breakwater is designed for bed levels of -2 m and -4.50 m, the sea-side armour consists of 2T tetrapod with a 1:2 slope, while the lee-side armour uses 0.5-1T stones with a 1:2 slope. The core is composed of 20-50 kg stones, and a 0.3 m thick bedding layer of 20 kg stones is provided. For the -4.5 m bed level, the sea-side armour utilizes 6T tetrapod with a 1:2 slope, and the lee-side armour employs 1-2T stones with a 1:2 slope. The core consists of 20-100 kg stones, and a 0.3 m thick bedding layer of 20 kg stones is used. All stones will have a density of 2.6 T/m^3. A 7m wide carriageway will be constructed on top of the breakwater.
- The roundhead portion of the breakwater, designed at -4.50 m bed level, features an 8.0T tetrapod armour layer on a 1:2 slope. This is supported by a 6 m wide toe berm composed of 3-4T stones. A clear carriageway of 8 m width is planned for this section.
- The construction may be phased to ensure safety and economy and temporary roundheads may be provided if work is curtailed.
- Regular surveys and maintenance are essential to identify and address any damage to the breakwater.

The hydraulic stability of the breakwater section was confirmed through wave flume studies, and the section was found to be safe from a hydraulic point of view. This design ensures the breakwater's ability to provide tranquil conditions in the harbour, protecting it from strong wave action while minimizing overtopping and structural damage.

7.6 Risk Assessment and Disaster Management Plan

Risk assessment is a methodology used to determine the nature and extend of risk by analysing potential hazards and evaluating existing conditions of vulnerability that could pose a potential threat or harm to people, livelihood, and the environment on which they depend. Risk management refers to the practices, policies, and procedures designed to minimize or eliminate the unacceptable risks.

7.6.1 Hazard Identification for the Project

Hazard identification is based on the likelihood of occurrence in a particular area. Kerala State Disaster Management Authority (KSDMA) has identified about 40 hazards likely to occur in the state, which include 17 natural hazards and 23 anthropogenic hazards as per Kerala State Disaster Management Plan (KSDMP) 2016.

To obtain more site-specific information, the hazards identified by the District Disaster Management Authority (DDMA) of Kasaragod District have also been referred from District Disaster Management Plan - 2015 (DDMP).

Based on KSDMP, 2016, and DDMP Kasaragod, 2015 the possible hazards likely to occur at the project site are identified and are classified into natural calamities (weather, geological, and biological) and anthropogenic activities. The possible hazards identified for the project site is given below:

a. Natural Calamities

The probability of occurrence of natural disasters at the site with respect to the maps available in DDMP Kasaragod for the corresponding natural disaster is detailed in Section 3.11 of Chapter 3 of this EIA report. The natural hazards identified to create risks at the project site are:

- Cyclone
- Lightning
- Earthquake
- Drought
- Flood
- Coastal hazards

Hazard seasonality mapping of Kasaragod District for the identified natural hazards is given in Table 7.2

Table 7.2: Hazard Seasonality Mapping of Kasaragod District

Type of Disaster	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cyclone				←	→							
Lightning				←	→				←	→		
Earthquake	←											→
Drought			←		→							
Flood						←		→				
Tsunami	←											→
Sea Erosion						←		→				

Type of Disaster	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Epidemics	←	—	—	—	—	—	—	—	—	—	—	→

Source: DDMP, Kasaragod - 2015

The possible hazards identified for the proposed project site are given below:

a. Anthropogenic Disasters

The anthropogenic hazards that may pose a risk to the proposed project can be categorized into hazards during the construction and operation phases. The major causes identified for the hazards during the construction phase of the harbour are given below:

- Oil & chemical spills
- Vessel Collisions
- Boat capsizing
- Accidental drowning
- Accidents at the construction site on the land like falling from heights, tripping, etc.

The major causes identified for the hazards during the operation phase due to the harbour activities are given below:

- Design deficiencies
- Damage to the structures
- Inadequate disposal of waste
- Overcrowding within the auction hall and its surroundings

7.6.2 Consequences Assessment

The risk consequence levels have been defined to quantify the assessed risk. These levels are given in Table 7.3, with consequences based on the severity of impact due to a hazard on people, the environment, and property.

Table 7.3: Risk Consequence Levels

Risk Levels	Consequences	Qualitative Description of Impact on		
		People	Environment	Property
1.	Insignificant (Manageable)	Event does not result in injury (no medical treatment required)	No damage	No damage
2.	Minor (Short term, manageable)	Reversible injury or illness	Minor impact of short duration or short-term damage	Minor damage
3.	Moderate (Medium term)	Irreversible disability or impairment to one or more persons	Short term damage resulting in complaints, localized impact	Moderate damage
4.	Major (Long term)	Severe injuries to one or more persons, single fatality	Significant impact locally and potential for off-site impacts	Major damage

Risk Levels	Consequences	Qualitative Description of Impact on		
		People	Environment	Property
5.	Catastrophic (Irreversible, permanent)	Multiple fatalities or irreversible injuries	Significant impacts to regional ecosystems and threatened species potential for widespread off-site impacts	Significant loss

7.6.3 Standard Risk Assessment Matrix

A standard risk assessment matrix for the proposed project has been developed based on the likelihood of the risk and its consequence levels. The Standard Risk Assessment Matrix is given in Table 7.4.

Table 7.4: Standard Risk Assessment Matrix

Risk Probability / Likelihood	Consequences				
	Catastrophic (Irreversible, permanent) (5)	Major (Long term) (4)	Moderate (Medium term) (3)	Minor (Short term, manageable) (2)	Insignificant (Manageable) (1)
Almost certain (5)	Extreme (25)	Extreme (20)	High (15)	Medium (10)	Medium (5)
Likely (4)	Extreme (20)	High (16)	High (12)	Medium (8)	Low (4)
Possible (3)	High (15)	High (12)	Medium (9)	Medium (6)	Low (3)
Unlikely (2)	Medium (10)	Medium (8)	Medium (6)	Low (4)	Low (2)
Rare (1)	Medium (5)	Low (4)	Low (3)	Low (2)	Low (1)

7.6.4 Project Specific Consequence Analysis and Risk Assessment

The site and project specific risk assessment matrix, representing the risks before the adoption of any mitigation measures, is depicted in Table 7.5.

Table 7.5: Project Specific Risk Assessment Matrix (without Mitigation Measures)

S. No.	Hazards	Likelihood	Consequences	Level of Risk (without mitigation)
Naturally Triggered / Weather Related Hazards				
1.	Cyclone	Possible (3)	Major (4)	High (12)
2.	Lightning	Possible (3)	Moderate (3)	Medium (9)
3.	Earthquake	Unlikely (2)	Moderate (3)	Medium (6)
4.	Drought	Possible (3)	Moderate (3)	Medium (9)
5.	Flood	Possible (3)	Moderate (3)	Medium (9)
6.	Coastal Hazard	Possible (3)	Major (4)	High (12)

S. No.	Hazards	Likelihood	Consequences	Level of Risk (without mitigation)
Anthropogenic / Technologically Triggered				
1.	Accidents during construction phase	Likely (4)	Major (4)	High (16)
2.	Accidents during operation phase	Possible (3)	Moderate (3)	Medium (9)

It is noted that among the natural hazards, cyclone, and coastal hazard present a high level of risk, while lightning, earthquake, drought and flood pose a medium level of risk. Regarding anthropogenic hazards, the risks anticipated from accidents occurring during the construction is assessed as high and for the operational phase is assessed as medium. This analysis restates the significance of adopting site and project specific mitigation measures for reducing the risks.

7.6.5 Mitigation Measures/ Facilities Proposed to Control Identified Risks

The project specific consequence analysis and risk assessment identified hazards with high or medium risk levels. The important aspects of preparedness for risk management and mitigation measures for each identified hazard are as follows:

Cyclone

- Technical assistance for early warning and hazard risk mitigation shall be obtained from DDMA Kasaragod.
- Emergency response team shall be activated immediately upon receiving timely warning from DDMA and adequate measures shall be taken when a warning for cyclone is issued to evacuate the workers.
- Construct harbor buildings, warehouses, and shelters using cyclone-resistant materials and design standards
- During cyclone warnings, all loose cargo, containers, and equipment should be secured or moved to safer storage areas to prevent them from becoming projectiles in high winds.

Lightning

- Provide lightning arrestors in the building at the landside facilities of the harbour.
- Regularly monitor weather forecasts and issue warnings when thunderstorm forecasts.
- Use audible or visual alarms in outdoor and exposed areas of a harbour to warn personnel of approaching lightning storms.
- Implement protocols to suspend operations during thunderstorms
- Establish designated lightning-safe shelters like fully enclosed buildings for workers.

Earthquake

- Emergency evacuation plan along with safety measures shall be implemented. All the information and instructions from concerned department and DDMA shall be scrupulously followed.
- Design and construct buildings and infrastructure to comply with national seismic building codes that account for earthquake forces.

Drought

- The project proposes to reduce its dependence on groundwater by harvesting and reuse of rainwater collected from the roof of buildings proposed in the harbour.
- Apart from this, measures shall be explored for the recharge of storm runoff into the groundwater.

Flood

- Synchronize the operation schedule with meteorological warnings to avoid work during heavy rain.
- Set up flood warning systems to alert harbour authorities, ship operators, and personnel, enabling them to take precautionary measures.
- Ensure that the harbour receives real-time data on weather conditions.
- Enhance storm water drainage systems to handle excess rainwater and prevent flooding within the harbour area. Ensure regular maintenance to keep drains and culverts clear of debris.
- Use flood-resistant materials for buildings and equipment near the waterfront.

Coastal Hazards

- Implement and maintain an early warning system for fishermen and harbour authorities to receive real-time alerts about tsunamis or high wave activities.
- Set up clear evacuation protocols and disseminate knowledge about safety measures during coastal emergencies.
- Restore natural sand dunes and plant mangroves or other salt-tolerant vegetation as natural buffers against storm surges and coastal erosion.

Accidents during construction phase of the project:

- Ensure safe storage and handling of oil and hazardous chemicals.
- Ensure emergency response equipment like protective gear, absorbents, neutralizing agents, and containment booms are readily available.
- Implement continuous monitoring of water and soil quality in and around the harbour to detect any signs of contamination early and take immediate corrective action.
- Ensure that all machinery operators receive thorough training on equipment use, safety procedures, and emergency protocols. Regular refresher courses should also be provided.
- Schedule construction activities to avoid the peak erosion periods, such as during the rainy season or high-wave conditions, to minimize the risk of erosion.
- Install temporary barriers or sandbags to protect construction sites and adjacent coastal areas from erosion caused by storms or high waves.
- Ensure boats are loaded safely and within capacity.
- Implement physical barriers or restricted access to dangerous water areas where drowning risks are high, such as construction sites or deep bodies of water.
- Develop and communicate a detailed emergency response plan for drowning incidents, including procedures for rescuing individuals, administering first aid, and contacting emergency services.

Accidents during operation phase of the project:

- Hazardous materials shall be stored in designated locations after obtaining necessary approvals.
- The leachable materials shall be stored in closed containers/leak proof packaging.
- Sufficient number of staff trained in first aid measures shall be deployed at the site at all times.
- Adequate number of first aid kits shall be provided.
- Fishers shall be encouraged to use adequate PPE & adequate safety measures shall be installed and regularly monitored.
- Skilled workers shall be chosen for operating the machineries.
- Develop and enforce traffic management plans to ensure the safe movement of vehicles and vessels within the harbour.
- Install and maintain clear and visible safety signs and warnings around the harbour to alert personnel and visitors to potential hazards and safety procedures.
- Establish and enforce standard operating procedures (SOPs) for all harbour operations, including emergency response to ensure consistency and safety.
- Continuously monitor weather conditions and implement protocols to suspend operations or take precautionary measures during adverse weather conditions, such as storms or high winds.
- Maintain reliable communication systems for coordination among personnel, ships, and emergency services. Use radios, alarms, and signalling devices to ensure effective communication.
- Conduct regular risk assessments to identify potential hazards and vulnerabilities in harbour operations. Use the findings to update safety protocols and mitigation measures.
- Implement measures to prevent environmental contamination, such as proper waste disposal, spill response systems, and monitoring of water quality to detect any potential pollution early.

7.6.6 Risk Assessment Matrix after Implementation of Mitigation Measures

The implementation of mitigation measures reduces the likelihood of occurrence of hazards. The impact of consequence can also be reduced by adopting suitable mitigation measures. Reduction of the likelihood of risk and level of consequences, reduces the overall level of risk, given in Table 7.6.

Table 7.6: Project Specific Risk Assessment Matrix (with Mitigation Measures)

S. No.	Hazards	Level of Risk (without mitigation)	Likelihood	Consequences	Level of Risk (with mitigation)
Naturally Triggered / Weather Related Hazards					
1.	Cyclone	High (12)	Possible (3)	Moderate (3)	Medium (9)
2.	Lightning	Medium (9)	Possible (3)	Minor (2)	Medium (6)
3.	Earthquake	Medium (6)	Unlikely (2)	Minor (2)	Low (4)
4.	Drought	Medium (9)	Possible (3)	Insignificant (1)	Low (3)
5.	Flood	Medium (9)	Possible (3)	Minor (2)	Medium (6)
6.	Coastal Hazard	High (12)	Possible (3)	Moderate (3)	Medium (9)
Anthropogenic / Technologically Triggered					

S. No.	Hazards	Level of Risk (without mitigation)	Likelihood	Consequences	Level of Risk (with mitigation)
1.	Accidents during construction phase	High (16)	Unlikely (2)	Minor (2)	Low (4)
2.	Accidents during operation phase	Medium (9)	Unlikely (2)	Minor (2)	Low (4)

It can be noted that the risk levels shall be reduced drastically by adopting suitable mitigation measures.

7.6.7 Emergency Preparedness Plan (EPP)

For the safe transition from normal operation to emergency operations and systematic shut down during the emergency, an Emergency Response Team with appropriate lines of authority with succession planning and actuating the response management at site has been identified. Objective of an Emergency Response Team are:

- To promptly control problems as they develop at the site.
- To prevent or limit the impact on other areas.
- To provide emergency personnel, selecting them for duties compatible with their normal work functions wherever feasible. The assigned roles and responsibilities should make full use of existing harbour services and organizations, including fire safety, health and medical services, transportation, personnel management, maintenance, and security, to ensure efficient coordination and an effective response during emergencies.
- Employees must assume additional responsibilities as per laid down procedure of DMP whenever an emergency alarm sounds.

Emergency Organization and Responsibility:

A structured approach with defined roles shall be designed to effectively manage and respond to the emergencies or disasters. An Organogram showing each component of Emergency Response Team for construction phase is shown in Figure 7.4.

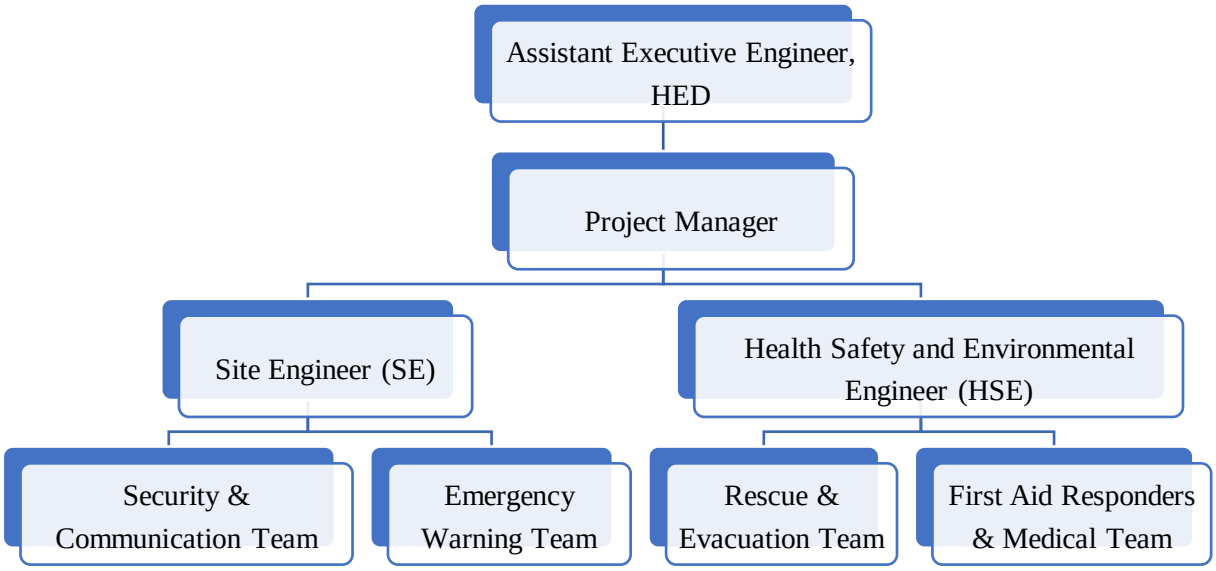


Figure 7.4: Organogram of Emergency Response Team for the Project

7.6.8 External Emergency Contact

The contact details of the concerned authorities in case of an emergency and the nearest fire stations/ police stations/hospitals etc. The details are given in Table 7.7. The distance to nearest police station, hospitals and fire & rescue station are given in Table 7.8. All these details shall be properly displayed at project site for easy access.

Table 7.7: External Emergency Contacts

S. No.	Official / Service	Telephone Number
1.	District Disaster Management Cell Collectorate, Kasaragod	0499 4257700
2.	Additional District Magistrate (ADM), Kasaragod	0499 4255833
3.	District Collector, Kasaragod	0499 4256400
4.	Municipal Corporation Secretary, Kanhangad	0467 2204530
5.	District Medical Officer (DMO), Kasaragod	9946105497
6.	District Hospital, Kanhangad	0467 2217019
7.	Primary Health Centre, Ajanur, Kanhangad	0467 2204985
8.	Manzoor Hospital, Kanhangad	0467 220 2070
9.	District Police Chief, Kasaragod	9497996972
10.	Hosdurg Police Station, Kanhangad	94979 80922
11.	Fire & Rescue Station, Kanhangad	0467 2202101
12.	KSEB Section Chithari Office, Kanhangad	0467 2267049

Table 7.8: Nearest Emergency Facilities

S. No.	Official / Service	Road Distance from Project Site (km)	Direction
Nearest Hospital			

S. No.	Official / Service	Road Distance from Project Site (km)	Direction
1.	Primary Health Centre, Ajanur, Kanhangad	1.60	SE of Southern breakwater
2.	Manzoor Hospital, Kanhangad	3.20	E of Southern breakwater
Nearest Police Station			
1.	Hosdurg Police Station, Kanhangad	5.00	SE of Southern breakwater
Nearest Fire Station			
1.	Fire and Rescue station, Kanhangad	5.00	SE of Southern breakwater

Chapter 8 Project Benefits

8.1 Improvement in the Physical Infrastructure

- A well-developed harbour, equipped with a basin, auction hall, wharf, adequate facilities for the fishers, etc. along with necessary infrastructural features such as access road, internal road, parking area, drainage facility, compound wall and side protection work will promote the overall growth of the fishing sector at the area.
- The construction of the northern and southern breakwater will provide a stable and tranquil location for the fishers to depart for fishing and bring back their catch.

8.2 Improvement in the Ecological Infrastructure

- The harbour will reduce the fishing vessel movement into the river channel and concentrate the same around the harbour, reducing the disturbance to the aquatic flora and fauna in the river channel.
- The harbour to be developed as a sustainable and eco-friendly harbour that's uses state-of-the-art smart technologies.
- RWH of capacity 50 kL is proposed within the harbour to ensure maximum harvesting of rainwater and its later use as freshwater at the facility.
- ETP of capacity 15 kLD is proposed for the treatment of 100% wastewater that will be generated from the landside facilities at the harbour. This will be minimizing harmful impact on ecosystems and public health that would have otherwise result from open disposal/ inadequate treatment of wastewater.
- The harbour will be fully powered by solar panels of capacity of 30 kW installed on-site.
- Green area of 3,000 m^2 is proposed with native trees and other plants at the harbour that will contribute to the local ecosystem and also enhance the aesthetics of the harbour.

8.3 Improvement in Social Infrastructure

- The improved auction hall will provide enhanced facilities and will smoothen operations in fish landing, processing, and auctioning, enabling a higher volume of catches to be processed and sold minimizing the wastage and also comfortable purchase facilities for the customers.
- Improved social infrastructure facilities for the fishers at the harbour such as toilets, rest sheds, canteen, etc. will ensure for fisher's welfare and comfort.
- Proposed construction of breakwaters will provide safe navigation facilities for the fishers, thereby protecting the life of fishers and their vessels.

8.4 Employment Potential

- Proposed construction of the harbour will provide employment opportunities for about 100 workers/day as direct employees and about 200 workers/ day as indirect employees during construction phase.
- During the operation phase of harbour 15 no. of staffs will be employed for the day-to-day operations in harbour.

- Proposed harbour will benefit 7,094 fishing population having 2,138 registered fishers spread over fishing villages from Hosdurg to Pallikkara in improving their quality and quantity of catches, and their enhancing their livelihood and economic stability.

8.5 Other Tangible Benefits

- Improved landside facilities will help in minimization of waste and enhancement of fish quality, thereby improve the marketing of catches.
- Safe landing facilities and calm harbour conditions will allow more fishing days, leading to higher income for fishers.
- Enhance the value of fish which will boost the revenue generated by fishing sector at the region.
- Development of the harbour to become a sustainable and tourism-oriented destination
- Beneficiary to the State revenue in the form of harbour fees, tariffs, and taxes.
- Enhance marine productivity and supports the goals of Pradhan Mantri Matsya Sampada Yojana (PMMSY)

In general, the proposed project will improve the socio-economic condition of the area.

Chapter 9 Environment Cost Benefit Analysis

Environmental cost benefit analysis is not required for the project as per the EIA Notification 2006 and hence not included in the EIA report

Chapter 10 Environment Management Plan

10.1 Environmental Policy

The HED, Government of Kerala shall develop the following Environmental Policy for the project:

- Develop and maintain a culture of Environmental stewardship.
- Implement proactive measures to prevent and control pollution, ensuring the protection of the local ecosystem. Safe and responsible disposal methods will be employed for any unavoidable waste.
- Provide adequate resources and personnel with the necessary training, skills, and knowledge to implement and uphold our environmental policies effectively.
- Establish and maintain systems and standard operating procedures to ensure compliance with all relevant environmental regulations and standards set by the Ministry of Environment Forest and Climate Change, as well as Government of Kerala and other local authorities.
- Actively communicate our environmental performance and progress to external stakeholders, including the local community and internal parties.

10.2 Implementation Arrangement for EMP

The implementation arrangement consists of the formation of the Environment Management Cell (EMC) and assigning roles and responsibilities to all members of the EMC for the prompt implementation of the EMP.

10.2.1. Environment Management Cell (EMC)

EMC shall be constituted as the institutional mechanism for ensuring the implementation of the EMP for the project.

10.2.1.1. Organogram of EMC

The organogram of EMC for the proposed fishing harbour is given in Figure 10.1.

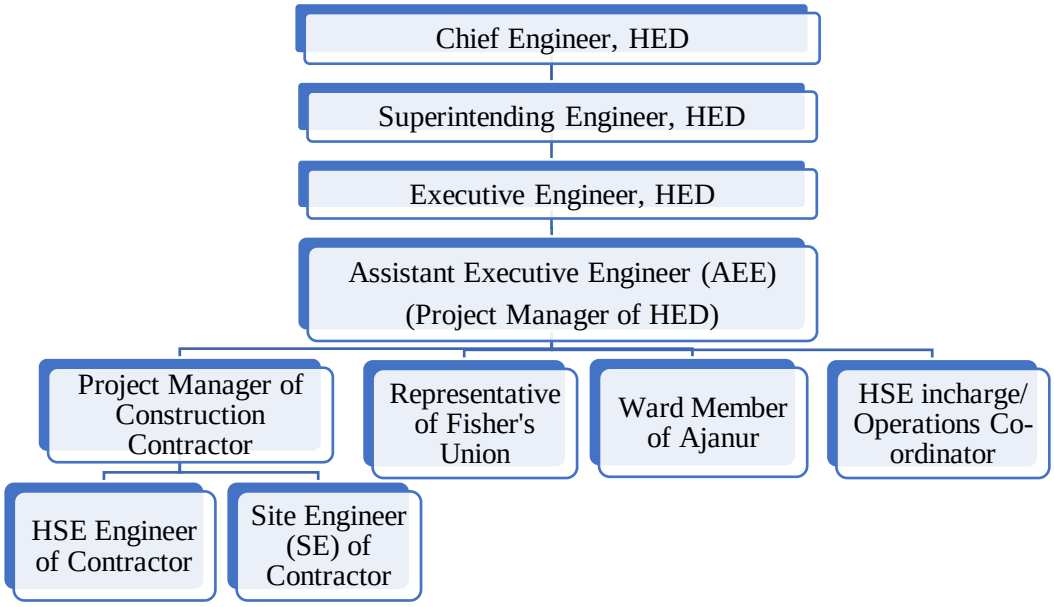


Figure 10.1: Structure of EMC for the Project

10.2.1.2. Flow of Information in EMC

During the construction phase, information from the field level shall be collected by the SE and HSE engineer of the construction contractor and shall report to their Project Manager. The Project Manager of the construction contractor shall report directly to the AEE of HED, who will also be the Project Manager of HED for this project. The AEE shall conduct inspections regarding the implementation of the EMP shall report to the Executive Engineer. During the operation phase, the representatives of the contractors will no longer be part of the EMC.

During the construction as well as the operation phase, the ground level implementation of the EMP shall also be overseen by the HSE in charge/ Operations Co-ordinator of the harbour, along with the representative of fisher's union and ward member of Ajanur. The presence of local ward member and representative of fisher's union in the EMC will ensure effective communication between the locals and fishers regarding their concerns and suggestions in the implementation of EMC. They shall report their updates to the AEE. The Executive Engineer shall be responsible for taking the field level decisions for the effective implementation of EMP. Executive Engineer shall report to the Superintending Engineer. Superintending Engineer will be responsible for evaluating the prompt functioning of the EMC and shall report the same to the Chief Engineer, who will be having the supreme charge of the project.

10.2.1.3. Role and Responsibilities of the EMC

1. Ensuring that all statutory environmental permits and clearances are obtained, and all conditions stipulated in these clearances/approvals are scrupulously followed.
2. Framing the site-specific Health Safety and Environment (HSE) guidelines, including awareness sessions on HSE guidelines in induction training programs, conducting refresher trainings on HSE guidelines, ensuring that, the HSE guidelines are being followed throughout the construction and operation phases of the project and updating the HSE guidelines as and when required.
3. Finalizing the EMP in the EIA report, including the cost estimates.
4. Ensuring the implementation of EMP through regular inspections at the site.
5. Conduct monthly meetings to evaluate the implementation of EMP and undertake corrective actions, if required.
6. Responsibilities must be assigned to relevant personnel for ensuring that the EMP documentation system is maintained, and that document control is ensured. Maintain the records of fund allocation of EMP activities and its progress and ensure the timely completion. Maintaining MoM of the meetings of the EMC, stakeholder engagements, grievance redressal meetings, etc.
7. Undertaking the EMoP through NABL accredited laboratory during the construction and operation phases.
8. Undertaking Environmental Compliance Audits once in a year for identification of non-compliances if any and suggesting corrective and preventive action.
9. Ensuring the employment opportunities for the local population in the construction phase
10. Maintaining the Grievance Redressal System and resolving any complaints from the construction workers/contractors, employees and local population
11. Maintaining an Environmental Issues Register, formulating necessary rectification measures for the issues based on the severity in consultation with relevant expert institutions.

12. Emergency/incident planning and review of the effectiveness of the same and adopting corrective actions, if any required. Communications with local bodies and District Administration for emergency preparedness.

10.3 Pollution and Waste Control Management Plan

10.3.1. Air and Noise Pollution Control Measures

The mitigation measures proposed to control the air pollution during construction phase includes transporting materials in covered vehicles, proper management of solid wastes to avoid burning of wastes, regular maintenance of machineries and vehicles, deploying vehicles with valid PUC for transportation of materials, providing barricades around the construction site etc.

To limit the spread of air pollutants from the construction areas to nearby populated areas, 3 m high barricades shall be erected around the construction site. The budget estimated for the same is INR 5,25,000 as capital cost and INR 55,000/ year as recurring cost.

Similarly, during operation phase, the mitigation measures proposed are proper maintenance of machineries and equipment and deploying vehicles with valid PUC for transport of materials and vehicle. Burning of garbage and waste shall not be permitted in the project site. The maintenance of the internal roads and parking areas shall be undertaken regularly to ensure these are in good conditions and the increase in vehicular movement of visitors to the harbour does not lead to unmanaged increase in fugitive emissions from the vehicular movement. For the maintenance of internal road and parking area, an amount of INR 2,75,000/ year shall be allocated as recurring cost.

Vehicle and equipment inspection camps shall be conducted yearly during the construction phase and operation phase. The budget estimated is a recurring cost of INR 1,00,000/ year during the construction phase and INR 50,000/ year during the operation phase, to ensure that the machinery and vehicles for the construction and operations conform to the prevailing noise regulations.

10.3.2. Wastewater Management Measures

Any spillage of fuel, oil or lubricants necessary for construction equipment/ machinery/ vehicles shall be stored at designated location with impervious floor to prevent spillage into land or water body. In-case of an accidental spillage onto the land/ water body, immediate spill containment measures shall be adopted. For this, spill containment kits which include absorbent pads, adsorbent socks, etc. shall be made available at the construction site.

10.3.2.1. Rainwater and Storm Water Management Plan

To conserve water, a RWH tanks of capacity 50 kL will be provided and the capital cost for the installation of RWH are considered in the project cost. The harvested rainwater shall be used to meet the fresh water requirement of the harbour. The RWH shall be regularly cleaned and filters shall be replenished at least twice a year, during the operation phase of the project.

For storm water management, a network of drain in the parking area will be provided for the disposal of storm water runoff into the river. These drains shall be laid during the beginning of constructions of landside facilities to effectively manage the stormwater runoff from the construction site. Along with drain a detention tank shall be provided for desilting the flow from the drains before it is let out into the

waterbody. During the operation phase, the storm water drains and the detention tank shall be regularly cleaned, especially before the onset of monsoon to avoid blockages.

10.3.2.2. Sewage Management Plan

Adequate sanitary facilities shall be provided for the construction workers by providing temporary toilets with portable STP for the management of wastewater from construction workers at site.

During operation phase ETP of capacity 15 kLD will be installed to manage the wastewater generated. The capital cost for the ETP is considered in the project cost. The Operation and Maintenance (O&M) of ETPs shall be properly carried out.

10.3.2.3. Budgetary Estimate for Wastewater Management

Budgetary estimate for wastewater management measures is given in Table 10.1.

Table 10.1: Budget estimate for Wastewater Management

S. No	Item	Capital Cost (in INR)	Recurring Cost per year (in INR)
Construction Phase			
1.	Oil spill containment kits (Including Absorbent Pads, Absorbent Socks, Disposable Bags, Safety Goggle etc.)	10,000	5,000
2.	Storm water management (a detention tank before disposal of water and seasonal desilting of this tank and the drains)	55,000	30,000
3.	Wastewater management of 100 workers by providing temporary toilets connected to portable STP	3,75,000	1,05,000
	Budgetary allocation for Construction Phase	**4,40,000**	***1,40,000***
Operation Phase			
1.	Maintenance of RWH tanks of capacity 50 kL	-	50,000
2.	Maintenance and seasonal desilting of the storm water drains and detention tank	-	25,000
3.	O&M cost for wastewater management for the harbour by using ETP of 15 kLD	-	2,10,000
	Budgetary allocation for Operation Phase	**-**	***2,85,000***

10.3.3. Solid Waste Management

For the management of waste at the site, efficient waste management system for sorting, recycling and reusing waste materials on-site shall be implemented. For the management of solid waste generated by 100 construction workers, 2 aerobic composting bins shall be provided. The non-biodegradable waste shall be collected in 'waste separation and collection bins' and shall be regularly handed over to authorised waste handlers. 2 sets of waste separation and collection bins shall be provided for collection of plastics, paper, cans & others. These bins may be relocated as per the progression of the work to the most easily accessible area for the construction workers at that particular period. For the efficient management of solid waste, an amount of INR 1,00,000 is estimated as capital cost and INR 40,000/year as recurring cost during the construction phase.

During operation phase, the waste generated at the fishing harbour by the operation workers and any other waste like fish waste, etc. shall be segregated at source to fish waste, biodegradables, plastics, and other waste. Fish waste shall be sold to recycle into fish meal. After construction phase, the bins used shall be reused at the landside facilities of the harbour during its operation phase. Any hazardous waste generated at the harbour shall be stored separately in closed areas on paved surfaces and the same shall be handed over to authorised hazardous waste handlers.

For the proper segregation of waste and its timely handing over, dedicated cleaning staff shall be appointed at the landside facilities. For solid waste management of operation phase, an amount of INR 60,000/year is estimated as recurring cost.

10.3.3.1. Concept of Waste Minimization

The project focusses on providing adequate auction hall and allied facilities at the harbour for the better post catch handling of the fishes. The harbour is proposed to be developed with smart technologies that will also help in efficient handling of the daily catch. This will increase the quality of the fishes for sale and ensure maximum sales of the catch, which will therefore minimize the wastage of fishes.

10.3.4. Clean Technology

Power requirement of the harbour during operation phase will be met from renewable energy sources. Solar panels of capacity 30 kW will be installed on the roof top of the suitable proposed structures. The budget for solar panel installation is estimated and is included in the project cost.

10.4 Natural Resource Conservation

10.4.1. Green Belt Development Plan

Green belt of 5 m width is proposed along the compound wall. The major purposes of greenbelt development are:

- Capture fugitive emissions, absorb pollutants and to aid in effective pollution control
- Retention of soil moisture and to prevent erosion
- Control spread of noise pollution beyond the project boundary
- Recharge of groundwater as well as to improve the microclimate
- Beneficial to preserve the biodiversity and thus preventing desertification of the area
- Enhance the aesthetics of the project site.

Species selected for green belt development is given in Table 10.2.

Table 10.2 Species selected for Green Belt

S. No.	Scientific Name	Local Name / Common Name	Family	Native / Exotic
1.	*Albizia lebbeck*	Vaga	Fabaceae	Native
2.	*Alstonia scholaris*	Ezhilamppala	Apocynaceae	Native
3.	*Artocarpus heterophyllus*	Chakka	Moraceae	Native
4.	*Azadirachta indica*	Ariyaveppu	Meliaceae	Native
5.	*Cocos nucifera*	Thengu	Arecaceae	Native

S. No.	Scientific Name	Local Name / Common Name	Family	Native / Exotic
6.	*Hibiscus tiliaceus*	Thaipparuthi	Malvaceae	Native
7.	*Mangifera indica*	Maavu	Anacardiaceae	Native
8.	*Moringa oleifera*	Muringai	Moringaceae	Native
9.	*Pongamia pinnata*	Pongam	Fabaceae	Native
10.	*Syzygium cumini*	Njaval	Myrtaceae	Native
11.	*Terminalia arjuna*	Nirmarutu	Combretaceae	Native
12.	*Thespesia populnea*	Poovaras	Malvaceae	Native

The budget for landscape development and green belt is included in the project cost. Apart from the capital cost, an amount shall be allocated for the maintenance of the green belt, yearly.

10.4.2. Conservation Plan for Schedule I species identified in the Study Area

Ptyas mucosa (Indian rat snake) and *Haliastur indus (Brahminy kite)* are the Schedule I species identified at the study area and the Conservation Plan for these species shall be prepared in consultation with concerned authorities.

10.4.3. Budgetary Allocation for Natural Resources Conservation

For the protection and conservation of the natural resources at the project site, the following training programs shall be undertaken:

- Construction workers shall be given awareness sessions for the implementation of EMP and for the conservation and protection of environment.
- During the operation phase, the fishers shall also be provided awareness training for using latest eco-friendly & most modern fishing measurers, etc.

The budgetary allocation for Natural Resources Conservation is detailed in Table 10.3.

Table 10.3: Budget estimate for Conservation Plan

S. No	Item	Capital Cost (in INR)	Recurring Cost per year (in INR)
Construction Phase			
1.	Ecological training for the workers on conservation and protection of the environment.	60,000	30,000
	Budgetary allocation for Construction Phase	***60,000***	***30,000***
Operation Phase			
1.	Maintenance of landscapes and green belt developed	-	1,10,000
2.	Awareness training for fishers on safety, environmental responsibilities, latest eco-friendly & most modern fishing measurers, etc.	-	45,000
	Budgetary allocation for Operation Phase	***-***	***1,55,000***

10.5 Occupational Health and Safety

It is the responsibility of the EMC for maintaining the Grievance Redressal System and resolving any complaints from the employees or fishers. The workers employed shall be provided with adequate basic amenities such as drinking water, sanitation facilities, PPE etc. An HSE engineer shall be appointed for daily inspection of sanitary and safety conditions at project site. Proper HSE trainings shall be provided at regular intervals for all the construction workers. Measures shall also be taken to minimise the risks to the workers such as fire hazards, accidents, etc. The budgetary estimate for ensuring occupational health and safety is given in Table 10.4.

Table 10.4: Budgetary Estimate for Occupational Health and Safety

S. No	Item	Capital Cost (in INR)	Recurring cost per year (in INR)
Construction Phase			
1.	Salary of HSE engineer for ensuring EMP is followed.	-	3,00,000
2.	Erection of warning sign boards: Near construction at the landside facilities, at material storage area, waste storage area, assembly area etc.	50,000	10,000
3.	HSE training for workers: 2-day induction training before start of construction and refresher training after 6 months.	30,000	15,000
4.	Appropriate PPE for 100 workers (helmet, jacket, shoes, life jacket, harness, googles, etc) and first aid facilities and water ambulance for workers.	5,15,000	80,000
5.	Medical check-up camps for 100 workers, once in 6 months	-	1,00,000
6.	Grievance redressal system for workers	-	40,000
Budgetary allocation for Construction Phase		***5,95,000***	***5,45,000***
Operation Phase			
1.	Pest control at the harbour premises, quarterly	-	45,000
2.	Medical checkup for the fishers and workers at the harbour.	-	2,00,000
3.	Grievance redressal system for harbour workers & fishers	-	50,000
Budgetary allocation for Operation Phase		***-***	***2,95,000***

10.6 EMP for Socio-Economic Environment

EMC shall maintain proper Grievance Redressal System. Half yearly meetings shall be conducted by the EMC both in construction as well as operation phase for resolving any complaints from the local population and the same shall be documented in the Grievance Redressal Register.

For ensuring that the construction activities do not cause inconvenience to the local public in terms of restrictions into the construction areas and other construction activities at the site, the people shall be

well informed of the construction and restriction on site through appropriate media (newspaper, radio) twice, at least 2 weeks prior to the start of the project. Soon after the completion of the constructions, the site shall be cleared of all construction debris, machinery, and the site shall be restored back. Traffic management measures such as providing clear instructions for traffic circulation by erecting sign boards and parking areas shall be provided to avoid congestion near the harbour due to the increased vehicular traffic to the harbour during the operational phase. The budgetary allocation for the same is given in Table 10.5.

Table 10.5: Budgetary Estimate for Socio-economic Environment

S. No	Monitoring Measure	Capital Cost (in INR)	Recurring Cost per year (in INR)
Construction Phase			
1.	Grievance redressal system for local population	-	40,000
2.	Informing people about construction & restriction on beach	15,000	-
3.	Erecting boards for traffic management within the harbour	35,000	-
4.	Site cleaning and restoration works	30,000	
	Budgetary allocation for Construction Phase	***80,000***	***40,000***
Operation Phase			
1.	Maintenance of traffic management boards in the harbour for regulating traffic	-	10,000
2.	Grievance redressal system for locals	-	50,000
	Budgetary allocation for Operation Phase	***-***	***60,000***

Corporate Environmental Responsibility (CER) is not applicable for the project as the proposed harbour does not attract EIA Notification 2006.

10.7 Monitoring for EMP

The measures to be taken to ensure that the mitigation measures are efficiently implemented and the budgetary allocation for the same is given in Table 10.6.

Table 10.6: Measures for Monitoring of EMP and its Budget

S. No	Monitoring Measure	Capital Cost (in INR)	Recurring Cost per year (in INR)
Construction Phase			
1.	Monthly meetings EMC and its necessary record keeping and inspections	-	35,000
2.	Environmental for monitoring quality of air, noise, soil, marine water, surface water, marine sediments.	-	2,46,000
	Budgetary allocation for Construction Phase	***-***	***2,81,000***
Operation Phase			
1.	Monthly meetings EMC and its necessary record	-	35,000

S. No	Monitoring Measure	Capital Cost (in INR)	Recurring Cost per year (in INR)
	keeping and inspections		
2.	Environmental for monitoring quality of air, noise, soil, marine water, surface water, marine sediments, inflow and outflow of ETP, DG set stack emission	-	2,85,000
3.	Shoreline Mapping	-	1,00,000
	Budgetary allocation for Operation Phase	**-**	***4,20,000***

10.8 EMP and Budgetary Provision for EMP

The EMP for the implementation of the proposed mitigation measures along with its implementation plan and budgetary allocation is depicted in Table 10.7. This includes the budget for implementation of the EMP in the construction and operation phases of the project. The efficient implementation of EMP for the construction phase shall be under the scope of the construction contractor and the implementation of EMP during the operation phase shall be under the scope of HED.

Table 10.7 Total Budget estimated for EMP

S. No.	Components	Potential Sources of Impact/ Pollution	Magnitude of Pollution	Control Measures	Budget		Responsibility	Timeframe	Monitoring
					Capital Cost In INR	Recurring Cost/ year in INR			
Construction Phase									
1.	Land	• Requirement of quarried granite stones. • Leakages of fuels, paints, etc. leading to contamination • Disposal of waste on land	High	• Purchase granite stones from quarry having valid EC. • Store fuels, paints, etc. on paved surfaces. • Management of C&D waste. • Solid and hazardous waste management	1,00,000	40,000	HSE and Site Engineer of Contractor	Construction period	Monthly
2.	Water	• Turbidity during dredging • Water requirement for construction • Withdrawal of groundwater	High	• Continuous monitoring turbidity levels • No withdrawal of groundwater from	4,40,000	1,40,000	HSE and Site Engineer of Contractor	Construction period	Daily

S. No.	Components	Potential Sources of Impact/ Pollution	Magnitude of Pollution	Control Measures	Budget		Responsibility	Timeframe	Monitoring
					Capital Cost In INR	Recurring Cost/ year in INR			
		• Wastewater generation by workers • Disposal of wastewater • Leakage of fuels/oils • Surface runoff from construction site		CRZ or wastage of water. • Purchased water via tankers for emergency. • Portable STP for wastewater management. • Refueling on paved designated surfaces. • Use oil spill containment kits in case of spills. • Cleaning and maintenance of drains, seasonally. • Detention tank before storm water disposal.					
3.	Air	• Unloading/ handling of construction material.	Moderate	• Dust barricade around constructions in landside facilities. • Vehicles with PUC	5,25,000	55,000	HSE and Site Engineer of Contractor	Construction period	Yearly

S. No.	Components	Potential Sources of Impact/ Pollution	Magnitude of Pollution	Control Measures	Budget		Responsibility	Timeframe	Monitoring
					Capital Cost In INR	Recurring Cost/ year in INR			
		• Storage of construction material areas • Vehicular movement • Burning of garbage		• Covered vehicles for material transport. • No open burning					
4.	Noise & Vibration	• Loading/ unloading of materials • Operating machines/ equipment. • Movement of vehicles. • Construction activities like drilling, carpentry, etc.	Moderate	• Regular maintenance and lubrications of machines/ equipment • Equipment and vehicular inspection camp	-	1,00,000	HSE and Site Engineer of Contractor	Construction period	Yearly
5.	Ecology & Biodiversity	• Seepage of pollutants/ waste into land/ water affecting flora & fauna. • Construction on refugee space of crabs, fishes.	Moderate	• Ecological awareness training to workers	60,000	30,000	Site Engineer and HSE of Contractor	Construction period	Half yearly

S. No.	Components	Potential Sources of Impact/ Pollution	Magnitude of Pollution	Control Measures	Budget		Responsibility	Timeframe	Monitoring
					Capital Cost In INR	Recurring Cost/ year in INR			
6.	Occupational Health and safety	• Unavailability of necessary facilities • Accidents at site • Poor working conditions	Moderate	• Provision for drinking water, toilets, etc. • Safety boards at site. • HSE engineer at site always • HSE training for workers • PPE for workers • First aid facilities • Medical check up • Grievance redressal for workers	5,95,000	5,45,000	HSE Engineer of Contractor	Construction period	Half yearly
7.	Socio-economic	• Restrictions into construction area of beach. • Inconvenience to the locals from construction activities and pollution. • Increased construction vehicular movement	Moderate	• Inform public prior to constructions • Grievance redressal for locals. • Erecting traffic management boards • Site restoration	80,000	40,000	HSE Engineer of Contractor and Ward members	Construction period	Half yearly

S. No.	Components	Potential Sources of Impact/ Pollution	Magnitude of Pollution	Control Measures	Budget		Responsibility	Timeframe	Monitoring
					Capital Cost In INR	Recurring Cost/ year in INR			
8.	Climate	• Operations of various construction equipment/ machinery/ vehicles	Moderate	• Use of fuel-efficient equipment/ machineries • Trip scheduling of vehicles	-	-	Site Engineer of Contractor	Construction period	Half yearly
9.	General Measures	• Non-implementing of EMP	High	• EMC meeting • EMoP, half yearly	-	2,81,000	EMC	Construction period	Monthly
Budget for EMP of Construction Phase					***18,00,000***	***12,31,000***			
Operation Phase									
1.	Land	• Disposal of untreated solid waste • Spillage/ leakage of oil, diesel etc.	Moderate	• Solid waste management and handing over of waste to authorized handlers.	-	60,000	Operations coordinator	Life of Harbour	Monthly
2.	Water	• Freshwater requirement • Withdrawal of groundwater • Wastewater generation • Disposal of waste into water	Moderate	• O&M of RWH tank (50 kL) • No withdrawal of groundwater • O&M of ETP of capacity 15 kLD • No disposal of untreated wastewater	-	2,85,000	Operations coordinator	Life of Harbour	Monthly

S. No.	Components	Potential Sources of Impact/ Pollution	Magnitude of Pollution	Control Measures	Budget		Responsibility	Timeframe	Monitoring
					Capital Cost In INR	Recurring Cost/ year in INR			
		• Runoff from landside facilitates • Spillage from boats & fuel storages.		• De-siltation and maintenance of drains with detention tank, Seasonally					
3.	Air	• Emissions from increased movement of vehicles to the harbour. • Emissions from machinery	Low	• Maintenance of internal roads and parking areas • Allow only vehicles with PUC.	-	2,75,000	Operations coordinator	Life of Harbour	Yearly
4.	Noise & Vibration	• Movement of fishing vessels and trucks • Operation of equipment.	Low	• Vehicle & equipment inspection camps	-	50,000	Operations coordinator	Life of Harbour	Yearly
5.	Ecology & Biodiversity	• Ecological habitat and species degradation due to increased boat movement, change in natural flow pattern • Unsuitable/ invasive species in green belt.	Moderate	• Training for fishers on environmental protection • Finalization of species for green belt in consultation with locals.	-	1,55,000	HSE in-charge of Harbour	Life of Harbour	Half yearly

S. No.	Components	Potential Sources of Impact/ Pollution	Magnitude of Pollution	Control Measures	Budget		Responsibility	Timeframe	Monitoring
					Capital Cost In INR	Recurring Cost/ year in INR			
		• Lack of maintenance of green belt & landscape.		• Maintenance of green belt and landscape.					
6.	Occupational Health and safety	• Unsanitary conditions and water logging • Pest menace • Accidents in sea while fishing • Unsatisfactory working conditions for the harbour staff.	Moderate	• Maintenance of harbour premises. • Pest control quarterly • Instruct fishers on PPE and first aid • Medical checkup for fishers, half yearly • Mandate for insurance, yearly • Grievance redressal for harbour staff and fishers	-	2,95,000	HSE in-charge of Harbour and Representative of Fisher's Union	Life of Harbour	Daily
7.	Socio-economic	• Rush & competition due to influx of customers • Traffic congestion • Disturbance and inconvenience to locals.	Moderate	• Evaluate adequacy of harbour facilities • Traffic management boards • Grievance redressal system for locals, Quarterly	-	60,000	Operations coordinator and ward member	Life of Harbour	Yearly

S. No.	Components	Potential Sources of Impact/ Pollution	Magnitude of Pollution	Control Measures	Budget		Responsibility	Timeframe	Monitoring
					Capital Cost In INR	Recurring Cost/ year in INR			
8.	Climate Change	• Power requirement	Low	• Solar panels	-	-	Operations coordinator	Life of Harbour	Yearly
9.	General Measures	• Non-implementing of EMP	High	• EMC meeting & inspections • EMoP, half yearly • Shoreline mapping, yearly	-	4,20,000	EMC	Life of Harbour	Monthly
Budget for EMP for Operation Phase					**-**	***16,00,000***			

Chapter 11 Summary & Conclusions

11.1 Project Description

The proposed project involves constructing a fishing harbour at Ajanur, Kasaragod Taluk, Kasaragod District, Kerala, near the mouth of the Chithari River, with a fish landing capacity of 28,695 TPA. Currently, the site has a deteriorated fish landing centre with inadequate facilities such as a damaged auction hall, net mending shed, and toilet block. Additionally, the river mouth is highly migratory, frequently shifting, blocked due to sand bar formations during summer and causing significant damage to existing fishers, their properties and the infrastructure of the fish landing centre.

The inadequate facilities and migratory nature of river mouth pose significant risks to fishers and limit the potential of Ajanur's coast. To address these issues, HED proposes northern and southern breakwaters with a river training wall, which will stabilize the river mouth, prevent its closure during summer, reduce flash flood risk, protect coastal and upstream communities and provide calm basin for landing of boats. The project also includes landside facilities for the harbour such as a wharf, auction hall, berthing wharf, and essential amenities such as rest rooms, toilets, etc. for fishers and harbour visitors, waste management measures, facilities for ensuring security at the harbour. The harbour is proposed with latest smart technologies to aid in efficient handling of the catch with minimum wastage and maximum returns.

11.2 Description of Environment

Baseline monitoring was done for environment and social parameters during the study period (19.12.2022 to 14.03.2023) through reconnaissance survey followed by field visits, sample collection, stakeholder consultations & door-to-door household surveys.

The core zone (2 km radius) is dominated by water bodies. Ambient air quality is within prescribed limits for NAAQS) - 2009. Noise levels are within limits specified by Noise Pollution (Regulation and Control) Rules, 2000. The surface water monitored had minimal suspended particles and agreeable odour, but high levels of hardness, chloride, dissolved solids and sulphates, due to its proximity to the sea. Marine water quality is generally good, with optimal pH levels, low concentrations of harmful bacteria, and adequate dissolved oxygen to support marine life. Presence of phytoplankton, zooplankton, and benthic organisms were recorded at various sampling stations. Marine sediment quality is generally good, with low organic matter and heavy metals such as lead, mercury and cadmium below detectable limits and iron, manganese, zinc and copper in moderate level.

The local climate is tropical with hot summers and monsoons. The biodiversity assessment found a variety of plant life, including Schedule I species - *Ptyas mucosa* (Rat Snake) and *Haliastur indus* (Brahminy Kite), within the 10.0 km study area. No endangered animals were observed in the proposed quarry site. During consultation meeting with local elected representatives, they showed strong community support for the project as it is essential for enhancing safety and preventing boat accidents, and improve the livelihoods of the underprivileged fishing community in Kasaragod. Key suggestions included adding more rescue boats and personnel, and constructing sea walls to address coastal erosion. During door-to-door surveys, residents reported that the issue of saltwater intrusion have forced

residents to depend exclusively on pipeline water for their water needs and the region faces recurring threats of flooding and sea encroachment.

11.3 Anticipated Environmental Impacts and Mitigation Measures

Potential environmental impacts include air and noise pollution from construction and operation activities, erosion of land, marine water contamination, wastewater generation etc. Mitigation measures like erection of dust barriers around proposed harbour facilities, regular maintenance of machineries and vehicles, proper management of storm water and waste materials, proper storage of hazardous materials etc. shall be implemented to reduce the impacts during construction phase. Regular monitoring of land erosion and deposition patterns by continuous shoreline mapping by HED, implementation of coastal management strategies, provision of ETP of capacity 15 kLD and RHW tank of capacity 50 kL, proper traffic management plan, installation of solar panels of capacity 30 kW etc. will be implemented as mitigation measures for operation phase.

11.4 Environmental Monitoring Program

EMoP has been prepared to monitor the environmental quality during construction phase as well as during operation phase and shall be carried out through a NABL accredited laboratory. The parameters to be monitored are ambient air (3 no.s), noise level (3 no.s), surface water (1 no.s), soil (1 nos.), marine water (2 no.s), marine sediment (2 no.s), inlet and outlet water from ETP and stack emission from DG set. The EMoP budget estimated for construction phase is INR 2.46 Lakhs/year and for operation phase is INR 2.85 Lakhs/year.

11.5 Additional Studies

11.5.1. Public Hearing

This project does not require public hearing as it does not come under the purview of EIA notification 2006.

11.5.2. HTL/ LTL Demarcation

National Centre for Earth Science Studies (NCESS), Thiruvananthapuram has prepared the CRZ Status Report and the HTL/LTL map in 1:4000 scale superimposing the project layout. As per the CRZ mapping, the project site falls under CRZ IA, CRZ IB, CRZ II, CRZ-IVA, and CRZ-IVB Proposed construction of compound wall of 16.48 m falls within CRZ IA. HED decided not to proceed with the construction of compound wall within CRZ IA.

11.5.3. Mathematical Modelling Studies

The mathematical modelling studies conducted by CWPRS to identify the best suited layout of the breakwaters or the harbour and the river training works with respect to impact on hydrodynamics, siltation, wave propagation, and shoreline changes. The studies used various models to analyse different aspects of the project, including littoral drift, wave propagation, hydrodynamics, and sediment transport. The recommended layout is expected to improve conditions at the river mouth and provide a tranquil harbour basin, making it more suitable for fishing vessels.

11.5.4. Wave Flume Study

The wave flume studies conducted by CWPRS determined the optimal cross-sections for the trunk and rounded portions of the breakwaters. The design of the breakwater includes tetrapod in the armour, a 7 m wide and 0.5 m thick crest slab, and a 0.5m thick parapet wall with the end of the breakwater protected by a proper roundhead. The hydraulic stability of the breakwater section was confirmed through wave flume studies, ensuring its safety from a hydraulic point of view.

11.5.5. Risk Assessment and Disaster Management Plan

The project faces risk from natural hazards like cyclone, lightning, earthquake, drought, flood and costal hazard, as well as anthropogenic risks. Mitigation measures were proposed to reduce these hazards' impact. An Emergency Response Team shall be established, and contact details for relevant authorities and nearby facilities identified shall be prominently displayed at the harbour. These measures aim to ensure a seamless transition from normal operations to emergencies.

11.6 Project Benefits

- Constructing northern and southern breakwaters with a river training wall will stabilize the river mouth, prevent its closure during summer, reduce flash flood risk, protect coastal and upstream communities and provide calm basin for landing of boats.
- Provide enhanced infrastructure that meets the growing demands of fishing community, ensures hygienic standards and promote sustainable fishing practices in line with Food and Agriculture Organization (FAO) guidelines.
- Boost to local economy by enabling continuous fishing activity for over 300 days annually
- Improved working and living conditions for 7,094 coastal residents, including 2,138 registered fishers, through minimized risks of property damage and loss of life due to unpredictable river mouth shifts
- Employment opportunities for 100 workers per day during construction phase and 15 permanent staff and indirect employment through allied services like transport, maintenance and fish marketing during operation phase
- Enhance marine productivity and supports the goals of Pradhan Mantri Matsya Sampada Yojana (PMMSY)
- Cost-Benefit ratio is estimated to be 1.37

11.7 Environment Management Plan and Recommendations

The EMP for the project outlines a comprehensive approach to environmental protection and mitigation. HED will implement an environmental policy that emphasizes sustainability, pollution prevention, and community engagement.

To ensure effective implementation of EMP, an EMC will be formed with clear roles and responsibilities. The EMP addresses potential impacts and their mitigation measures. The EMP also includes budgetary allocations for various activities to ensure adequate resources for implementation.

Based on the EIA studies and other surveys conducted for the proposed project it can be concluded that the potential adverse environmental impacts can be mitigated to an acceptable level by adequate

implementation of the environment management measures. The recommendations for further mitigating the impacts of the project are:

- Continuously track the river mouth's movement and channel depth. If significant river mouth shifting occurs, even after project completion, then mitigation strategies recommended by the CWPRS (construction of seawall) shall be under taken.
- Measure the erosion rate at the southern side and if the erosion rate is found more than the prediction of CWPRS then the mitigation measures suggested by CWPRS shall be followed.

Chapter 12 Disclosure of Consultants

12.1 Introduction

This EIA report has been prepared by the environmental consulting firm, ULTRA TECH (Environmental Consultancy and Laboratory), on behalf of the HED of Government of Kerala. The report also incorporates relevant inputs from the project proponent.

ULTRA TECH, is a leading EIA consulting organization providing economically viable and feasible environmental solutions for sustainable development of new projects in 13 NABET accredited sectors. NABET accreditation certificate is attached as Annexure 2.

The company has network of operations as follows:

12.2 Address of Offices & Contact Details

The address and contact details of the head and branch offices are given in Table 12.1.

Table 12.1: Details of the Head & Branch Offices

Office Location	Address	Contact Details
Head Office, Thane	Unit No.: 206, 224-225, Jai Commercial Complex, Eastern Express Highway, Opp.: Cadbury, Thane West – 400 601, Maharashtra State, India	Ms. Rekha Margam +91 8149500506 Ms. Dipti Rathod +91 8692900073
Branch Office, Pune	C-1, 202, Saudamini Commercial Complex, Bhusari colony, Paud Road, Kothrud Pune – 411038, Maharashtra -India	Mr. Vikrant Kulkarni +91 9004666814
Branch Office, Kochi	Door no. 54/3858, 2nd floor, Chakkanat Building, Fatima Church Road, Elamkulam, Kadavanthra P.O., Ernakulam, Kerala - 682020	Ms. Ananthitha. A +91 9895200526
Branch Office, Kolkata	BD-009, 1st Ave Rd, BD Block, Sector 1, Salt Lake, Bidhannagar, Kolkata, West Bengal 700064	Mr. Debasish Sengupta +91 9674488198
Branch Office, Gandhinagar	Plot No. 305/2, Nr. GH-1, Sector-3, New Gandhinagar, Gujarat 382006	Mr. Roshan +91 9558117469

12.3 Brief Resume and Nature of Consultancy

The company is known for its specialization in offering a comprehensive suite of services related to environmental consulting, environmental laboratory testing, engineering for Effluent Treatment Plants (ETP), Sewage Treatment Plants (STP), Water Treatment Plants (WTP), project consultancy, as well as the operation and maintenance of ETP and STP Plants, with a dedicated team of over 250 environmental professionals. ULTRA TECH is in its commitment to delivering high-quality environmental services and has earned a reputation for its expertise in the field.

ULTRA TECH provides services in the following environmental domain; Environmental Impact Assessment, Social Impact Assessment, Environment Management Plan, Quantitative Risk Assessment, Disaster Management Plan, Rehabilitation and Resettlement, Coastal Regulatory Zone Clearances, Forest Clearance, Wild Life Clearance, No Objection Certificates for CFE, CFO and Renewals, Environmental Due Diligence, Social Due Diligence, Environmental Audit, Social Audit, Ecological Due Diligence, Environmental Legal Advisory Services, Environmental Status Reports.

ULTRA TECH's commitment to delivering high-quality environmental services and its extensive expertise in various sectors make it a valuable partner for projects seeking environmental clearances and sustainable development

ULTRA TECH has its own state of the art NABL certified and MoEF& CC approved Laboratory and providing environmental baseline as well as compliance monitoring. The laboratory monitors and analyses various environmental parameters, including air quality, water quality, soil quality, groundwater quality, surface water quality, noise levels, and meteorological data etc.

ULTRA TECH has completed several thousand assignments in environmental consultancy and clearance for large building construction and area development projects apart from infrastructure, industrial and related projects sectors. The ULTRA TECH laboratory is serving as the backbone of all the core business services and ETP-STP-WTP projects department has been providing engineering and project management consultancy on turnkey basis handling O & M of several hundred plants in Mumbai and suburban areas.

12.4 EIA Team Member

The work presented in this report was carried out by ULTRA TECH. The names of the team members associated with the preparation and studies of EIA/EMP other than those mentioned in Part A of Annexure VII are given in Table 12.2.

Table 12.2: Details of the Team Members

Name of Internal Team Member	Activity/Area	Involvement	Under Approved Expert
		Actual Work Performed	
Ms. Ananthitha A	Quality Check & Project Coordinator	Project planning, team framing, work distribution, review of EIA report; guidance in modification of contents.	EIA Coordinator
Mr. Vishudath	Quality Check & Review	Guidance in modification of contents.	EIA Coordinator
Ms. Thushara Sudheish K	Team lead and EIA report writing – project details and EMP	Coordination for data collection, data analysis, coordination with FAEs and team members; compiling the primary & secondary	EIA Coordinator

Name of Internal Team Member	Activity/Area	Involvement	Under Approved Expert
		Actual Work Performed	
Ms. Farsana Nazrin V. B.	EIA Report writing - Ecology and Biodiversity	project data for EIA report; EIA/EMP report preparation by conducting site visit.	FAE - EB
Ms. Gayathri MN	EIA Report writing - project details and EMP	Coordination with FAEs and team members; compiling the primary & secondary data for EIA report; EIA/EMP report preparation	EIA Coordinator
Ms. Ambily U S	EIA Report writing - Land Use		FAE - LU
Ms. Shahana Younus	Assisting in EIA Report writing	Assisting in EIA/EMP report preparation, data analysis, coordination with FAEs and team members.	FAE - WP
Ms. Anju Mathew	Assisting in EIA Report writing		FAE - AP
Ms. Malavika S	Assisting in EIA Report writing		FAE - SW

12.5 Laboratory Information

The details of the laboratory for baseline environmental monitoring are given in in Table 12.3. NABL certificate of the laboratory is attached as Annexure 3.

Table 12.3: Details of Laboratory

Name of Laboratory	NABL Certificate No.	Address	Contact Infromation
M/s. Envirodesigns Eco Labs	Certificate No. TC-7114 valid till 18.10.2025	Eco Tower, Janatha Jn., Palarivattom, Kochi, Kerala, India	Dr. K. L. Antony + 91 9388609505 lab@envirodesigns.in

Annexure 1: Environmental Baseline Monitoring Reports

ENVIRODESIGNS
ECO LABS
(Food Quality / Water / Environmental Testing Lab)
In pursuit of quality

ISO 9001:2015, ISO 45001:2018 Certified organisation
Approved 'A' grade Lab by Kerala State Pollution Control Board
Accredited Lab by NABL as per ISO 17025:2017 (Cert No: TC-7114)
Recognised Lab by Ministry of Environment, Forests & Climate Change (Govt. of India) as per E (P) Act 1986

TC-7114

NOISE LEVEL MONITORING REPORT

Report No. : EEL/LR/23/0021743/686
Issue Date : March 22, 2023

Issued To:
M/s. ULTRA TECH
Environmental Consultancy and Laboratory
No.199, First Floor, Door No. 55/1308- B
Girinagar, Near Community Hall, Club Road
Kadavanthra, Kochi-682020.

Customer ref. : Email dt. 03.02.2023
Project: - Construction of Ajanoor Fishing Harbour, Kasargod
Proposed Project Location : Kanhangad
Monitoring done by: Lab field technicians

Sample Particulars: Ambient Noise Level Monitoring

Source of monitoring : Ambient Noise Level Monitoring (24 Hrs)
Sampling method : Monitoring Protocol No. EEL/ENV/MP/01
Method Used: IS 9989:1981

Location Code	ANQ1	ANQ2	ANQ3
Date of Monitoring	09.03.23 – 10.03.23	10.03.23 – 11.03.23	10.03.23 – 11.03.23
Time of Monitoring	09.00AM –09.00AM	09.00AM –09.00AM	09.00AM –09.00AM
Location of Monitoring	Near Indian Oil Chithari Fuel	Near Iqbal HSS , Kanhangad	Next to proposed project site
Location coordinates	N 12^0 21' 35.56'' E 75^0 3' 53.20''	N 12^0 19' 50.37'' E 75^0 4' 41.77''	N 12^0 20' 10.03'' E 75^0 3' 54.57''
Lab Identification Code	N/03/684	N/03/685	N/03/686
Sample receipt form Ref. No. with date	SRF/N/03/684 dt.13.03.23	SRF/N/03/685 dt.13.03.23	SRF/N/03/686 dt.13.03.23

Presentation of Results

Location Code	Location of Monitoring	Value Reported in dB (A) L_{eq}	
		Day time	Night time
ANQ1	Near Indian Oil Chithari Fuel	49.8	40.4
ANQ2	Near Iqbal HSS , Kanhangad	48.1	37.3
ANQ3	Next to proposed project site	42.5	35.6

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TC-7114

NOISE LEVEL MONITORING REPORT

Report No. : EEL/LR/23/0021743/686

Presentation of Results

Sl. No.	Hourly Interval (hrs)	Hourly L_{eq} Values		
		ANQ1	ANQ2	ANQ3
1.	09:00-10:00	50.3	51.2	45.3
2.	10:00-11:00	51.8	50.3	46.3
3.	11:00-12:00	50.3	49.3	48.3
4.	12:00-13:00	51.6	49.8	47.6
5.	13:00-14:00	52.3	50.3	45.8
6.	14:00-15:00	50.8	48.6	44.3
7.	15:00-16:00	50.2	49.7	40.8
8.	16:00-17:00	52.3	51.2	41.7
9.	17:00-18:00	55.6	50.3	40.8
10.	18:00-19:00	50.7	47.6	40.2
11.	19:00-20:00	49.6	48.3	39.8
12.	20:00-21:00	48.3	44.6	38.2
13.	21:00-22:00	48.1	40.3	38.7
14.	22:00-23:00	46.3	39.6	36.8
15.	23:00-00:00	43.2	37.8	35.4
16.	00:00-01:00	40.1	35.1	33.2
17.	01:00-02:00	38.3	34.9	33.6
18.	02:00-03:00	35.6	35.8	34.6
19.	03:00-04:00	35.8	36.3	35.3
20.	04:00-05:00	36.1	36.8	35.8
21.	05:00-06:00	39.7	39.2	37.1
22.	06:00-07:00	42.3	40.1	38.2
23.	07:00-08:00	44.8	42.3	39.1
24.	08:00-09:00	46.7	48.3	40.6

LIMIT AS PER NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000				
	Industrial Area	Commercial Area	Residential Area	Silence Zone
Day Time	75	65	55	50
Night Time	70	55	45	40

Note: Day time means - 6.00 AM to 10.00 PM Night time means - 10.00 PM to 6.00 AM

Instruments used for Monitoring

1. Sound Level Meter, Make: Cygnet, Model: A0106-302, ID No. : EEL/SLM/01
2. Sound Level Meter, Make: Cygnet, Model: 2511, ID No. : EEL/SLM/02

Susan Abraham
Technical Manager
Authorised Signatory
Envirodesigns Eco Labs

....End of Report.....

ENVIRODESIGNS ECO LABS KOCHI-25

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TC-7114

TEST REPORT

Report No. : EEL/LR/23/0021736/679
Issue Date : March 22, 2023

Issued To:
M/s. ULTRA TECH
Environmental Consultancy and Laboratory
No.199, First Floor, Door No. 55/1308- B
Girinagar, Near Community Hall, Club Road
Kadavanthra, Kochi-682020.

Customer ref. : Email dt. 03.02.2023
Project: - Construction of Ajanoor Fishing Harbour, Kasargod
Proposed Project Location: Kanhangad
Sample receipt form Ref. No. : SRF/SO/03/679 dt. 10.03.2023
Sampling done by: Customer

Sample Particulars: Soil sample

Sample receiving date : March 10, 2023
Analysis starting date : March 10, 2023
Quantity of sample received: 1 kg x 1
Packaging details: Plastic cover
Location coordinates : 12°20'10.06" N 75° 3'54.92" E
Tests required: For the parameters listed below;

Lab identification code: SO/03/679
Analysis completion date: March 20, 2023
Description of sample by the customer: Soil 1(S1)
(Location- Fishing Landing Centre, Ajanoor)

SAMPLE TESTED AS RECEIVED

Sl. No.	Parameters	Unit	Method	Result
1.	pH	--	IS 10158: 1982	6.6
2.	Conductivity	µS/cm	IS 14767 : 2000	282
3.	Water Holding Capacity	%	Indian Bureau of Mines Analysis of Soil: 2012	52
4.	Organic Matter	%	IS 2720 (Pt 22): 1972	0.23
5.	Sulphur	mg/kg	IS 14685: 1999	207.75
6.	Total Phosphorus	mg/kg	USEPA 3052 : 1996	23.35
7.	Sodium	mg/kg	USEPA 3052 : 1996	159.72
8.	Potassium	mg/kg	USEPA 3052 : 1996	208.54
9.	Particle Size distribution (Dry weight basis)	%	SOP No. EEL/WP/SO/09	
	a) Above 2.36 mm			12.34
	b) 2.36-1.18 mm			13.28
	c) 1.18 mm-600 microns			14.03
	d) 600-425 microns			11.33
	e) 425-300 microns			18.20
	f) 300-150 microns			19.48
	g) 150-75 microns			6.22
	h) Below 75 microns			4.92

Susan Abraham
Technical Manager
Authorised Signatory
Envirodesigns Eco Labs

....End of Report.....

ENVIRODESIGNS ECO LABS KOCHI-25

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Kadavanthra, Kochi-682020.

Customer ref. : Email dt. 03.02.2023
Project: - Construction of Ajanoor Fishing Harbour, Kasargod
Proposed Project Location: Kanhangad
Sample receipt form Ref. No. : SRF/SO/03/679 dt. 10.03.2023
Sampling done by: Customer

Sample Particulars: Soil sample

Sample receiving date : March 10, 2023
Analysis starting date : March 10, 2023
Quantity of sample received: 1 kg x 1
Packaging details: Plastic cover
Location coordinates : 12°20'10.06" N 75° 3'54.92" E
Tests required: For the parameters listed below;

Lab identification code: SO/03/679
Analysis completion date: March 20, 2023
Description of sample by the customer: Soil sample(S1)
(Location- Fishing Landing Centre, Ajanoor)

SAMPLE TESTED AS RECEIVED

Sl. No.	Parameters	Unit	Method	Result
1.	Chloride (Water extractable)	mg/kg	SOP No. EEL/WP/SO/04	242.18
2.	Total Kjeldhal Nitrogen	%	IS 10158: 1982	771.57
3.	Phosphate	mg/kg	USEPA 3052 : 1996	55.60

....End of Report.....

Susan Abraham
Technical Manager
Authorised Signatory
Envirodesigns Eco Labs

ENVIRODESIGNS ECO LABS KOCHI-25

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TEST REPORT

Report No. : EEL/LR/23/0021737/680
Issue Date : March 22, 2023

Issued To:
M/s. ULTRA TECH
Environmental Consultancy and Laboratory
No.199, First Floor, Door No. 55/1308- B
Girinagar, Near Community Hall, Club Road
Kadavanthra, Kochi-682020.

Customer ref. : Email dt. 03.02.2023
Project: - Construction of Ajanoor Fishing Harbour, Kasargod
Proposed Project Location: Kanhangad
Sample receipt form Ref. No. : SRF/W/03/680 dt. 10.03.2023
Sampling done by: Customer

Sample Particulars: Water sample

Sample receiving date : March 10, 2023
Analysis starting date : March 10, 2023
Quantity of sample received: 1 L x 2
Packaging details: Pet bottle
Lab identification code: W/03/680
Analysis completion date: March 20, 2023
Description of sample by the customer: Surface water 1 (SW1) [Chithari River]

Location coordinates : 12°21' 58.5" N 75°3 '30.06" E
Tests required: For the parameters listed below,

SAMPLE TESTED AS RECEIVED

Sl. No.	Parameters	Unit	Method	Result
1.	pH at 25°C	---	Cl.2 of IS 3025 (Pt 11):1983	7.5
2.	Colour	Hazen Units	Cl. 2 of IS 3025 (Pt 4):2021	4.0
3.	Odour	---	IS 3025 (Pt 5): 2018	Agreeable
4.	Turbidity	NTU	IS 3025 (Pt 10):1984	0.80
5.	Total Hardness as $CaCO_3$	mg/l	Cl. 5 of IS 3025 (Pt 21):2009	8160
6.	Iron as Fe	mg/l	Cl. 6 of IS 3025 (Pt 53):2003	0.22
7.	Chloride as Cl	mg/l	Cl. 2 of IS 3025(Pt 32):1988	18345.38
8.	Fluoride as F	mg/l	Cl. 5 of IS 3025(Pt 60):2008	BDL(MDL-0.2)
9.	Total Dissolved Solids	mg/l	IS 3025(Pt 16):1984	38090
10.	Sulphate as SO_4	mg/l	Cl. 4 of IS 3025(Pt 24):1986	3324.38
11.	Total Alkalinity as $CaCO_3$	mg/l	Cl. 8.1 of IS 3025(Pt 23):1986	133.25
12.	Nitrate as NO_3	mg/l	Cl. 3 of IS 3025(Pt 34):1988	1.42

Note:- BDL: Below Detection Limit MDL: Minimum Detection Limit

Sl. No.	Parameters	Method	Result
1.	E.coli or thermotolerant coliform bacteria, MPN/100ml	IS 1622 : 1981	<2
2.	Total coliform bacteria, MPN /100ml	IS 1622 : 1981	<2

Susan Abraham
Technical Manager
Authorised Signatory
Envirodesigns Eco Labs

....End of Report.....

Jesty M. T.
Dy.Tech. Manager-Microbiology
Authorised Signatory
Envirodesigns Eco Labs

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TEST REPORT

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Kadavanthra, Kochi-682020.

Customer ref. : Email dt. 03.02.2023
Project: - Construction of Ajanoor Fishing Harbour, Kasargod
Proposed Project Location: Kanhangad
Sample receipt form Ref. No. : SRF/W/03/680 dt. 10.03.2023
Sampling done by: Customer

Sample Particulars: Water sample

Sample receiving date : March 10, 2023
Analysis starting date : March 10, 2023
Quantity of sample received: 1 L x 2
Packaging details: Pet bottle
Lab identification code: W/03/680
Analysis completion date: March 20, 2023
Description of sample by the customer: Surface water 1 (SW1) [Chithari River]
Location coordinates : 12°21' 58.5" N 75°3 '30.06" E
Tests required: For the parameters listed below,

SAMPLE TESTED AS RECEIVED

Sl. No.	Parameters	Method	Result
1.	Phytoplankton, cells/ml	IS 1622 : 1981	40
2.	Zooplankton, cells/ml	APHA 10200	20

....End of Report.....

Jesty M. T.
Dy.Tech. Manager-Microbiology
Authorised Signatory
Envirodesigns Eco Labs

ENVIRODESIGNS ECO LABS KOCHI-25

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TEST REPORT

Report No. : EEL/LR/23/0021732/675
Issue Date : March 22, 2023

Issued To:
M/s. ULTRA TECH
Environmental Consultancy and Laboratory
No.199, First Floor, Door No. 55/1308- B
Girinagar, Near Community Hall, Club Road
Kadavanthra, Kochi-682020.

Customer ref. : Email dt. 03.02.2023
Project: - Construction of Ajanoor Fishing Harbour, Kasargod
Proposed Project Location: Kanhangad
Sample receipt form Ref. No. : SRF/W/03/675 dt. 10.03.2023
Sampling done by: Customer

Sample Particulars: Water sample

Sample receiving date : March 10, 2023
Analysis starting date : March 10, 2023
Quantity of sample received: 1 L x 2
Packaging details: Pet bottle
Lab identification code: W/03/675
Analysis completion date: March 20, 2023
Description of sample by the customer: Marine water 1 (MW1) [Muttumthala Beach]
Location coordinates : 12°20' 16.65" N 75°3 '46.00" E
Tests required: For the parameters listed below,

SAMPLE TESTED AS RECEIVED

Sl. No.	Parameters	Unit	Method	Result
1.	pH at 25^{0}C	---	Cl.2 of IS 3025 (Pt 11):1983	7.4
2.	Colour	Hazen Units	Cl. 2 of IS 3025 (Pt 4):2021	4.0
3.	Odour	---	IS 3025 (Pt 5): 2018	Agreeable
4.	Turbidity	NTU	IS 3025 (Pt 10):1984	3.80
5.	Total Hardness as $CaCO_3$	mg/l	Cl. 5 of IS 3025 (Pt 21):2009	7140
6.	Iron as Fe	mg/l	Cl. 6 of IS 3025 (Pt 53):2003	0.46
7.	Chloride as Cl	mg/l	Cl. 2 of IS 3025(Pt 32):1988	19568.40
8.	Fluoride as F	mg/l	Cl. 5 of IS 3025(Pt 60):2008	BDL(MDL-0.2)
9.	Total Dissolved Solids	mg/l	IS 3025(Pt 16):1984	38286
10.	Sulphate as SO_4	mg/l	Cl. 4 of IS 3025(Pt 24):1986	2030.02
11.	Total Alkalinity as $CaCO_3$	mg/l	Cl. 8.1 of IS 3025(Pt 23):1986	102.50
12.	Nitrate as NO_3	mg/l	Cl. 3 of IS 3025(Pt 34):1988	0.34
13.	Conductivity	µS/cm	IS 3025 (Pt 14):2013	63810
14.	Calcium as Ca	mg/l	Cl. 5 of IS 3025(Pt 40):1991	490.58
15.	Magnesium as Mg	mg/l	Cl. 6 of IS 3025(Pt 46):1994	1440.55
16.	Sodium as Na	mg/l	IS 3025 (Pt 2) : 2019	10698.14
17.	Potassium as K	mg/l	IS 3025 (Pt 2) : 2019	58.62

Note:- BDL: Below Detection Limit MDL: Minimum Detection Limit

ENVIRODESIGNS ECO LABS KOCHI-27

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TC-7114

Report No. : EEL/LR/23/0021732/675

Sl. No.	Parameters	Unit	Method	Result
18.	Mercury as Hg	mg/l	Cl. 5 of IS 3025 (Pt 48):1994	BDL(MDL-0.0005)
19.	Lead as Pb	mg/l	IS 3025(Pt 2):2019	BDL(MDL-0.005)
20.	Copper as Cu	mg/l	IS 3025 (Pt 2) : 2019	BDL(MDL-0.01)
21.	Zinc as Zn	mg/l	IS 3025(Pt 2):2019	0.08
22.	Cadmium as Cd	mg/l	IS 3025(Pt 2):2019	BDL(MDL-0.001)
23.	Total Suspended Solids	mg/l	IS 3025 (Pt 17): 1984	16
24.	Biochemical Oxygen Demand @ 27°C for 3 days	mg/l	IS 3025(Pt 44):1993	3.20
25.	Chemical Oxygen Demand	mg/l	IS 3025(Pt 58): 2006	156
26.	Dissolved Oxygen	mg/l	Cl. 4.1 & 4.2 of IS 3025 (Pt 38) :1989	5.60
27.	Oil & Grease	mg/l	Cl. 5 of IS 3025(Pt 39): 2021	BDL(MDL-0.05)
28.	Salinity	mg/l	USEPA 842-B-06- 003: 2006	32264.40
29.	Temperature	^{0}C	USEPA 170.1: 1974	31
30.	Phosphate as PO_4	mg/l	Cl. 4 of IS 3025 (Pt 31):1988	0.49

Note:- BDL: Below Detection Limit MDL: Minimum Detection Limit

Sl. No.	Parameters	Method	Result
1.	E.coli or thermotolerant coliform bacteria, MPN/100ml	IS 1622 : 1981	<2
2.	Faecal coliforms, MPN /100ml	IS 1622 : 1981	<2

....End of Report.....

Susan Abraham
Technical Manager
Authorised Signatory
Envirodesigns Eco Labs

Jesty M. T.
Dy.Tech. Manager-Microbiology
Authorised Signatory
Envirodesigns Eco Labs

ENVIRODESIGNS ECO LABS KOCHI-25

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TEST REPORT

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Kadavanthra, Kochi-682020.

Customer ref. : Email dt. 03.02.2023
Project: - Construction of Ajanoor Fishing Harbour, Kasargod
Proposed Project Location: Kanhangad
Sample receipt form Ref. No. : SRF/W/03/675 dt. 10.03.2023
Sampling done by: Customer

Sample Particulars: Water sample

Sample receiving date : March 10, 2023
Analysis starting date : March 10, 2023
Quantity of sample received: 1 L x 2
Packaging details: Pet bottle
Lab identification code: W/03/675
Analysis completion date: March 20, 2023
Description of sample by the customer: Marine water 1 (MW1) [Muttumthala Beach]
Location coordinates : 12°20' 16.65" N 75°3 '46.00" E
Tests required: For the parameters listed below,

SAMPLE TESTED AS RECEIVED

Sl. No.	Parameters	Method	Result
1.	Phytoplankton, cells/ml	IS 1622 : 1981	80
2.	Zooplankton, cells/ml	APHA 10200	40

....End of Report.....

Jesty M. T.
Dy.Tech. Manager-Microbiology
Authorised Signatory
Envirodesigns Eco Labs

ENVIRODESIGNS ECO LABS KOCHI-25

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TC-7114

TEST REPORT

Report No. : EEL/LR/23/0021733/676
Issue Date : March 22, 2023

Issued To:
M/s. ULTRA TECH
Environmental Consultancy and Laboratory
No.199, First Floor, Door No. 55/1308- B
Girinagar, Near Community Hall, Club Road
Kadavanthra, Kochi-682020.

Customer ref. : Email dt. 03.02.2023
Project: - Construction of Ajanoor Fishing Harbour, Kasargod
Proposed Project Location: Kanhangad
Sample receipt form Ref. No. : SRF/W/03/676 dt. 10.03.2023
Sampling done by: Customer

Sample Particulars: Water sample

Sample receiving date : March 10, 2023
Analysis starting date : March 10, 2023
Quantity of sample received: 1 L x 2
Packaging details: Pet bottle
Lab identification code: W/03/676
Analysis completion date: March 20, 2023
Description of sample by the customer: Marine water 2 (MW2) [Ajanoor Beach]
Location coordinates : 12°19' 53.43" N 75°3 '58.21" E
Tests required: For the parameters listed below,

SAMPLE TESTED AS RECEIVED

Sl. No.	Parameters	Unit	Method	Result
1.	pH at 25°C	---	Cl.2 of IS 3025 (Pt 11):1983	7.4
2.	Colour	Hazen Units	Cl. 2 of IS 3025 (Pt 4):2021	4.0
3.	Odour	---	IS 3025 (Pt 5): 2018	Agreeable
4.	Turbidity	NTU	IS 3025 (Pt 10):1984	6.90
5.	Total Hardness as $CaCO_3$	mg/l	Cl. 5 of IS 3025 (Pt 21):2009	8670
6.	Iron as Fe	mg/l	Cl. 6 of IS 3025 (Pt 53):2003	0.16
7.	Chloride as Cl	mg/l	Cl. 2 of IS 3025(Pt 32):1988	18345.38
8.	Fluoride as F	mg/l	Cl. 5 of IS 3025(Pt 60):2008	BDL(MDL-0.2)
9.	Total Dissolved Solids	mg/l	IS 3025(Pt 16):1984	37380
10.	Sulphate as SO_4	mg/l	Cl. 4 of IS 3025(Pt 24):1986	2402.50
11.	Total Alkalinity as $CaCO_3$	mg/l	Cl. 8.1 of IS 3025(Pt 23):1986	102.50
12.	Nitrate as NO_3	mg/l	Cl. 3 of IS 3025(Pt 34):1988	0.49
13.	Conductivity	µS/cm	IS 3025 (Pt 14):2013	62500
14.	Calcium as Ca	mg/l	Cl. 5 of IS 3025(Pt 40):1991	613.22
15.	Magnesium as Mg	mg/l	Cl. 6 of IS 3025(Pt 46):1994	1738.59
16.	Sodium as Na	mg/l	IS 3025 (Pt 2) : 2019	10012.50
17.	Potassium as K	mg/l	IS 3025 (Pt 2) : 2019	64.26

Note:- BDL: Below Detection Limit MDL: Minimum Detection Limit

ENVIRODESIGNS ECO LABS KOCHI-25

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TC-7114

Report No. : EEL/LR/23/0021733/676

Sl. No.	Parameters	Unit	Method	Result
18.	Mercury as Hg	mg/l	Cl. 5 of IS 3025 (Pt 48):1994	BDL(MDL-0.0005)
19.	Lead as Pb	mg/l	IS 3025(Pt 2):2019	BDL(MDL-0.005)
20.	Copper as Cu	mg/l	IS 3025 (Pt 2) : 2019	BDL(MDL-0.01)
21.	Zinc as Zn	mg/l	IS 3025(Pt 2):2019	BDL(MDL-0.01)
22.	Cadmium as Cd	mg/l	IS 3025(Pt 2):2019	BDL(MDL-0.001)
23.	Total Suspended Solids	mg/l	IS 3025 (Pt 17): 1984	22
24.	Biochemical Oxygen Demand @ 27°C for 3 days	mg/l	IS 3025(Pt 44):1993	3.10
25.	Chemical Oxygen Demand	mg/l	IS 3025(Pt 58): 2006	144
26.	Dissolved Oxygen	mg/l	Cl. 4.1 & 4.2 of IS 3025 (Pt 38) :1989	5.60
27.	Oil & Grease	mg/l	Cl. 5 of IS 3025(Pt 39): 2021	BDL(MDL-0.05)
28.	Salinity	mg/l	USEPA 842-B-06- 003: 2006	30247.88
29.	Temperature	^{0}C	USEPA 170.1: 1974	31
30.	Phosphate as PO_4	mg/l	Cl. 4 of IS 3025 (Pt 31):1988	0.28

Note:- BDL: Below Detection Limit MDL: Minimum Detection Limit

Sl. No.	Parameters	Method	Result
1.	E.coli or thermotolerant coliform bacteria, MPN/100ml	IS 1622 : 1981	<2
2.	Faecal coliforms, MPN /100ml	IS 1622 : 1981	<2

....End of Report.....

Susan Abraham
Technical Manager
Authorised Signatory
Envirodesigns Eco Labs

Jesty M. T.
Dy.Tech. Manager-Microbiology
Authorised Signatory
Envirodesigns Eco Labs

ENVIRODESIGNS ECO LABS KOCHI-25

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Customer ref. : Email dt. 03.02.2023
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Proposed Project Location: Kanhangad
Sample receipt form Ref. No. : SRF/W/03/676 dt. 10.03.2023
Sampling done by: Customer

Sample Particulars: Water sample

Sample receiving date : March 10, 2023
Analysis starting date : March 10, 2023
Quantity of sample received: 1 L x 2
Packaging details: Pet bottle
Lab identification code: W/03/676
Analysis completion date: March 20, 2023
Description of sample by the customer: Marine water 2 (MW2) [Ajanoor Beach]
Location coordinates : 12°19' 53.43" N 75°3 '58.21" E
Tests required: For the parameters listed below,

SAMPLE TESTED AS RECEIVED

Sl. No.	Parameters	Method	Result
1.	Phytoplankton, cells/ml	IS 1622 : 1981	160
2.	Zooplankton, cells/ml	APHA 10200	80

....End of Report.....

Testy M T
Dy.Tech. Manager-Microbiology
Authorised Signatory
Envirodesigns Eco Labs

ENVIRODESIGNS ECO LABS *KOCHI-25*

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Issue Date : March 22, 2023

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Kadavanthra, Kochi-682020.

Customer ref. : Email dt. 03.02.2023
Project: - Construction of Ajanoor Fishing Harbour, Kasargod
Proposed Project Location: Kanhangad
Sample receipt form Ref. No. : SRF/SO/03/677 dt. 10.03.2023
Sampling done by: Customer

Sample Particulars: Sediment sample

Sample receiving date : March 10, 2023
Lab identification code: SO/03/677
Analysis starting date : March 10, 2023
Analysis completion date: March 20, 2023
Quantity of sample received: 1 kg x 1
Description of sample by the customer: Marine Sediment 1(MS1) [Muttumthala Beach]
Packaging details: Plastic cover
Location coordinates : 12°20' 16.65" N 75°3 '46.00" E
Tests required: For the parameters listed below;

SAMPLE TESTED AS RECEIVED

Sl. No.	Parameters	Unit	Method	Result
1.	pH	--	IS 10158: 1982	7.2
2.	Texture - Sand	%	SOP No. EEL/WP/SO/08	45
3.	Texture - Silt	%	SOP No. EEL/WP/SO/08	7.0
4.	Texture - Clay	%	SOP No. EEL/WP/SO/08	48
5.	Organic Matter	%	IS 2720 (Pt 22): 1972	0.03
6.	Total Phosphorus	mg/kg	USEPA 3052 : 1996	58.42
7.	Aluminium	mg/kg	USEPA 3052 : 1996	2.02
8.	Iron	mg/kg	USEPA 3052 : 1996	1007.51
9.	Lead	mg/kg	USEPA 3052 : 1996	BDL(MDL-1.0)
10.	Manganese	mg/kg	USEPA 3052 : 1996	1.05
11.	Zinc	mg/kg	USEPA 3052 : 1996	2.03
12.	Copper	mg/kg	USEPA 3052 : 1996	1.78
13.	Mercury	mg/kg	USEPA 3052 : 1996	BDL(MDL-0.05)
14.	Cadmium	mg/kg	USEPA 3052 : 1996	BDL(MDL-1.0)

Note:- BDL: Below Detection Limit MDL: Minimum Detection Limit

....End of Report.....

Susan Abraham
Technical Manager
Authorised Signatory
Envirodesigns Eco Labs

ENVIRODESIGNS ECO LABS KOCHI-23

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Sampling done by: Customer

Sample Particulars: Sediment sample

Sample receiving date : March 10, 2023
Analysis starting date : March 10, 2023
Quantity of sample received: 1 kg x 1
Packaging details: Plastic cover
Lab identification code: SO/03/677
Analysis completion date: March 20, 2023
Description of sample by the customer: Marine Sediment 1(MS1) [Muttumthala Beach]
Location coordinates : 12°20' 16.65" N 75°3 '46.00" E
Tests required: For the parameters listed below;

SAMPLE TESTED AS RECEIVED

Sl. No.	Parameters	Unit	Method	Result
1.	Total Kjeldhal Nitrogen	%	IS 10158: 1982	97.63

Sl. No.	Parameters	Method	Result
1.	Benthos per sample	APHA 10500	15

....End of Report.....

Susan Abraham
Technical Manager
Authorised Signatory
Envirodesigns Eco Labs

Jesty M. T.
Dy.Tech. Manager-Microbiology
Authorised Signatory
Envirodesigns Eco Labs

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Sampling done by: Customer

Sample Particulars: Sediment sample

Sample receiving date : March 10, 2023
Analysis starting date : March 10, 2023
Quantity of sample received: 1 kg x 1
Packaging details: Plastic cover
Lab identification code: SO/03/678
Analysis completion date: March 20, 2023
Description of sample by the customer: Marine Sediment 2 (MS2) [Ajanoor Beach]
Location coordinates : 12°19' 53.43" N 75°3 '58.21" E
Tests required: For the parameters listed below;

SAMPLE TESTED AS RECEIVED

Sl. No.	Parameters	Unit	Method	Result
1.	pH	--	IS 10158: 1982	7.3
2.	Texture - Sand	%	SOP No. EEL/WP/SO/08	41
3.	Texture - Silt	%	SOP No. EEL/WP/SO/08	7.0
4.	Texture - Clay	%	SOP No. EEL/WP/SO/08	52
5.	Organic Matter	%	IS 2720 (Pt 22): 1972	0.042
6.	Total Phosphorus	mg/kg	USEPA 3052 : 1996	48.49
7.	Aluminium	mg/kg	USEPA 3052 : 1996	1.54
8.	Iron	mg/kg	USEPA 3052 : 1996	1042.31
9.	Lead	mg/kg	USEPA 3052 : 1996	BDL(MDL-1.0)
10.	Manganese	mg/kg	USEPA 3052 : 1996	1.34
11.	Zinc	mg/kg	USEPA 3052 : 1996	3.29
12.	Copper	mg/kg	USEPA 3052 : 1996	2.37
13.	Mercury	mg/kg	USEPA 3052 : 1996	BDL(MDL-0.05)
14.	Cadmium	mg/kg	USEPA 3052 : 1996	BDL(MDL-1.0)

Note:- BDL: Below Detection Limit MDL: Minimum Detection Limit

....End of Report.....

Susan Abraham
Technical Manager
Authorised Signatory
Envirodesigns Eco Labs

ENVIRODESIGNS ECO LABS KOCHI-25

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Sampling done by: Customer

Sample Particulars: Sediment sample

Sample receiving date : March 10, 2023
Analysis starting date : March 10, 2023
Quantity of sample received: 1 kg x 1
Packaging details: Plastic cover
Lab identification code: SO/03/678
Analysis completion date: March 20, 2023
Description of sample by the customer: Marine Sediment 2 (MS2) [Ajanoor Beach]
Location coordinates : 12°19' 53.43" N 75°3 '58.21" E
Tests required: For the parameters listed below;

SAMPLE TESTED AS RECEIVED

Sl. No.	Parameters	Unit	Method	Result
1.	Total Kjeldhal Nitrogen	%	IS 10158: 1982	101.02

Sl. No.	Parameters	Method	Result
1.	Benthos per sample	APHA 10500	13

....End of Report.....

Susan Abraham
Technical Manager
Authorised Signatory
Envirodesigns Eco Labs

Jesty M. T.
Dy.Tech. Manager-Microbiology
Authorised Signatory
Envirodesigns Eco Labs

ENVIRODESIGNS ECO LABS KOCHI-25

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Annexure 2: NABET Accreditation Certificate

भारतीय गुणवत्ता परिषद्
QUALITY COUNCIL® OF INDIA
QCI Creating an Ecosystem for Quality

NABET

National Accreditation Board for Education and Training

Certificate of Accreditation

ULTRA TECH, Thane

206, 224-225, Jai Commercial Complex, Eastern Express Highway, Opp. Cadbury, Khopat, Thane- 400601

*The organization is accredited as **Category-A** under the QCI-NABET **Scheme for Accreditation of EIA Consultant Organization, Version 3**: for preparing EIA/EMP reports in the following Sectors*

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals including opencast / underground mining	1	1 (a) (i)	A
2.	River Valley projects	3	1 (c)	A
3.	Thermal power plants	4	1 (d)	B
4.	Metallurgical industries (ferrous & non-ferrous)	8	3 (a)	A
5.	Cement plants	9	3 (b)	A
6.	Synthetic organic chemicals industry	21	5 (f)	A
7.	Distilleries	22	5 (g)	A
8.	Oil & gas transportation pipeline (crude and refinery/ petrochemical products), passing through national parks/ sanctuaries/coral reefs / ecologically sensitive areas including LNG terminal	27	6 (a)	A
9.	Ports, harbours, break waters and dredging	33	7 (e)	A
10.	Highways,	34	7 (f)	A
11.	Common Effluent Treatment Plants (CETPs)	36	7 (h)	B
12.	Building and construction projects	38	8 (a)	B
13.	Townships and Area development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated February 18, 2025 posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/25/3541 dated March 10, 2025. The accreditation needs to be renewed before the expiry date by ULTRA TECH, Thane following due process of assessment.

Valid up to
October 18, 2027

Issue Date
March 10, 2025

Certificate No.
NABET/EIA/24-27/RA 0378

Varinder Kanwar
Prof (Dr) Varinder S Kanwar
CEO - NABET

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.

Annexure 3: NABL Accreditation Certificate of the Laboratory

National Accreditation Board for Testing and Calibration Laboratories

CERTIFICATE OF ACCREDITATION

ENVIRODESIGNS ECO LABS

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

ECO TOWER, JANATHA JN., PALARIVATTOM, KOCHI, KERALA, INDIA

in the field of

TESTING

Certificate Number: TC-7114

Issue Date: 19/10/2023 **Valid Until:** 18/10/2025

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.
(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Name of Legal Entity: ENVIRODESIGNS ECO LABS

Signed for and on behalf of NABL

N. Venkateswaran
Chief Executive Officer

GOVERNMENT OF KERALA

Harbour Engineering Department



CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DETAILED PROJECT REPORT

PRADHAN MANTRI MATSYA SAMPADA YOJANA

OCTOBER 2024

File No. HECE/207/2022-DR8 (Computer No. 19397)

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SYNOPSIS

Ajanur is a fishing village situated near Chithari River with an urban catchment of high population density. The river is to the north of Kanhangad Town in Kasaragod District. This area is a well-known fishing area in Kasaragod District and a number of fishing crafts operate from this area. Both the fishermen and the fishery industry of the region are persistently demanding for further development of the area. In addition to the demand for construction of a new fishing harbour, there have been persistent demands to make the Chithari river mouth permanent and prevent the formation of the sand bars at the mouth.

The mouth of Chithari River is of migratory nature and often gets completely closed in summer seasons. The closing of the river mouth causes flash floods at the coastal areas where the estuary out falls in to the sea. People living on the upstream side of river face disaster due to this. The condition gets aggravated as the catchment or the storm drainage area of the river is densely populated urban area. The discharge from the river is not sufficient to flush out the sand bars created by coastal marine morphology, hence man made efforts are required on an annual basis to open the river mouth before monsoons. Another problem is the migratory nature of the river mouth, which moved far south in the last few years causing damages to the auction halls and other infrastructure created for fishery at the site.

Harbour Engineering Department entrusted Mathematical Model Studies to Central Water Power Research Station (CWPRS, Pune) for establishing a fishing harbor and for training work of Chithari River. The layout of breakwaters for construction of an open sea fishing harbor is based on this model study.

This detailed project report is prepared for the construction of an open sea fishing harbour and river training work along with other infrastructures at Ajanur in Kasaragod District in Kerala State under PMMSY. The master plan includes construction of north and south breakwaters, training wall on the north side based on CWPRS recommendations, wharf and auction hall, dredging and reclamation, berthing wharf, canteen, net mending shed, shop rooms, locker rooms, gate and gate house, office cum surveillance room, ETP etc .The estimated project cost including all the components is **20000 lakh** The estimate is prepared using Kerala Government PRICE software, which is based on the DSR 2018 rates with current cost index for Kasaragod District (33.05%).

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Annexures **Ajanur Fishing Harbour – Calculation of wharf length, Cost Benefit Analysis, Soil Investigation Report, Mathematical Model Study Reports, Estimates, Drawings**

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1. PROJECT SUMMARY

1.	Title of the project	Construction of Ajanur Fishing Harbour
2.	District	Kasaragod
	Taluk	Kasaragod
	Corporation/Municipality/Panchayath	Ajanur GramaPanchayath
	Assembly Constituency	Kanhangad LAC
3.	Implementing agency	Harbour Engineering Department
4.	DPR prepared by	Harbour Engineering Department
5.	Project outlay	Rs. 20000 lakhs
6.	Nature of the project	Construction of new Fishing harbour
7.	Present status of existing Fisheries Infrastructure	Fish landing Centre
8.	Need for the project (Brief)	• Providing a safe harbour for the artisanal fishing operations in Kasargode District. • To improve the hygiene standards in post-harvest operations and ensure better product quality satisfying EEC/HACCP norms. • To promote responsible fishing practices as envisaged by FAO. • Providing training works for Chithari River to keep the estuary open and prevent inundation.
9.	Total estimated cost and item wise cost break up	Project Abstract of Estimate (Attached as Annexure)
	Whether detailed estimate attached?	Yes (Attached as Annexure)
10.	Details of revenue streams	User charges, Lease of rights
11.	Details of project risks	• Availability of Construction materials Availability of Labourers • Quarrying restrictions • Fund flow • Climate changes

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12.	Details of project management organisation strategy	• Estimation, Technical Sanctions, Tendering and Agreement Execution will be done by Harbour Engineering Department • PRICE software is the tool for preparing, scrutinizing and transmitting the estimates. • Tendering will be done by inviting online e-tenders from pre-qualified contractors. • MS Project is the tool used for scheduling the projects. • Work Execution and preparation of Bills will be done by Harbour Engineering Department.
13.	Details of contract management strategy	• The Public Works manual of state government specifies the duties, responsibilities and delegated powers of officers in contract management. It also specifies fines for project delays and incentives for early completion. • HED will invite tenders, execute agreement and supervise the work.
14.	Details of Project Implementation Schedule (PIS) & Work Breakdown Schedule (WBS) Proposed duration to complete the project	WBS Bar Chart.
15.	Details of statutory clearances obtained	
16.	Quality Control infrastructure and mechanism	• Three tier quality control systems will be implemented. • First tier quality control will be done by the contractor. • The second tier quality control will be done by the QC wing of HED. • For third tier QC the service of a reputed

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		institution outside HED will be utilized.
17.	Details of attached drawings	• Key Map of Project Location • General Layouts • Breakwater sections • Wharf and auction hall • Gate and Gatehouse • Net Mending shed, Locker room, Canteen, Shop rooms • Compound wall and Side Protection Works • Parking Area and Internal Road • Dredging and Reclamation bund • Wharf for berthing facility
18.	Other attachments	• General abstract • Detailed estimate • Model Study Report

2. INTRODUCTION

2.1 Location and Regional Setting

2.1.1 Ajanur is one of the prominent fishing villages of Kasaragod district with extensive fishing activity. The project site is situated near the estuary of Chithari backwaters and is located in Ajanur Gram Panchayath in KasaragodTaluk. Project site is located at 12.33° Latitude and 75.06° Longitude.

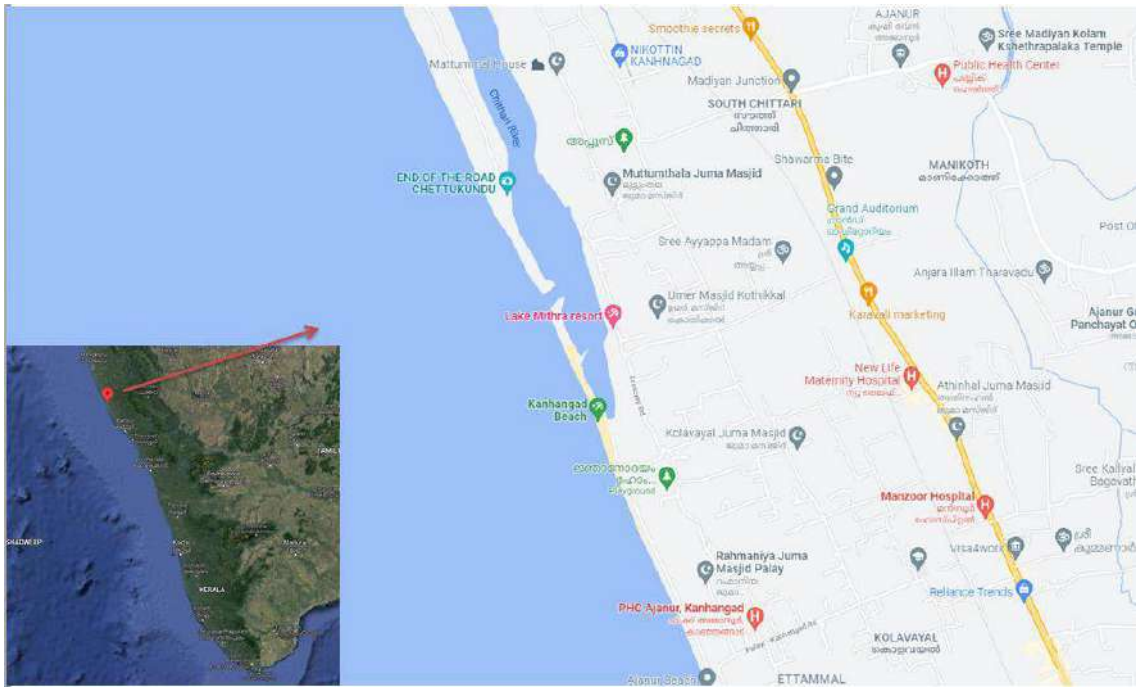


Figure 2.1 Location map of proposed fishing harbor site

2.1.2 The site is easily accessible from major roads through a network of coastal roads. The proposed project site is located 17 km north of existing Cheruvattur Fishing Harbour and 17km south of Kasargod Fishing Harbour.

2.2 Necessity of the Proposal

2.2.1 In order to meet the temporary needs of the poor fishermen of the area, a fish landing center was constructed, accessible through the Chithari River, as part of ICAD project. There is an auction hall, net mending shed and toilet block situated at the southern bank of estuary of Chithari River. But, this landing centre is not fully used by the fishermen due to the inadequate facilities.

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2.2.2 Here, use of landing centre is mainly dependent on availability of shore in front of it. Sometimes, shore is eroded very close to auction hall, and any further erosion may lead to the collapse of the structure. Local fishermen demanded to have a jetty in front of it, and other additional facilities. Protection wall is also necessary to avoid soil erosion from the land. There is also demand from the fishermen of nearby area of Chitharikadappuram to construct a fish landing center for them also. All these point to the extensive fishing operation of the region. Fishing villages from Hosdurg to Pallikkara will be benefited by the project.

2.2.3 At present, the fishermen of the locality carry out their fishery activities from Chithari River. The coastal morphological changes at this river mouth are highly complex. The migration of the river mouth and the formation of sand bars have caused considerable loss of human life and land property in this area. During the onset of monsoons and when there are heavy rains in the catchments upstream, the closing of the river mouth causes extreme problems like flash floods all along the highly populated upstream area, and the people here are reportedly rehabilitated to safety each time.

2.2.4 The fishermen venturing in to the sea or coming back with the catches face extreme danger at the river mouth due to presence of sand bars. Many lives have been lost in the last few years due to this. Also the fishing vessels and engines are damaged. The river mouth needs to be manually dredged to avoid sudden flashfloods during the onset of monsoon. Often the government machinery fails to do this in time causing flood related disasters to the people living upstream. Hence there is an urgent requirement to provide necessary river training work of Chithari River to arrive at a permanent solution to the problems faced by the local population.

2.3 The Proposal

2.3.1 This proposal is put forward to construct a fishing harbour to provide necessary infrastructure facilities to cater to the needs of the locality. The mouth of Chithari River is of migratory nature and often gets completely closed in summer seasons. The discharge from the river is not sufficient to flush out the sand bars created by coastal marine morphology, hence man made efforts are required on an annual basis to open the river mouth before monsoons. Provision for training work of

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Chithari River is also included in this proposal to address the issues caused by the migratory nature of the river and to keep the estuary open. Width of the channel provided is 130 m which is not sufficient for the safe navigation of the vessels in rough season. Hence it is proposed to construct an open sea harbour

2.3.2 This proposal consists of provisions for construction of north breakwater of 1150m length and south breakwater of 425 m length, river training work of 435 m length, wharf, auction hall, dredging and reclamation, canteen, net mending shed, shop rooms, locker rooms, gate and gate house, etc. As per the model study report (No: 6283) shore protection measures needs to be provided on north and south side of the development after monitoring the shore line changes post harbour construction which is explained in the conclusion 7.0 (v and vi) as

"If the erosion on the south side of the proposed fishing harbour is progressive after the development then a suitable shore protection measure in the form of a seawall or series of groynes may be provided."

and

"If the shifting of the river mouth is pronounced after the proposed development of the river training works then a seawall of appropriate length may be provided to arrest the shifting of the river mouth."

Hence the provision for this component is not included in this DPR which may be taken up later.

2.3.3 The estimates were prepared using Kerala Government's PRICE software, which is based on the CPWD data, DSR 2018 rates and the current cost index for Kasargod District. The total cost for the proposed fishing harbour at Ajanur comes to **Rs. 20000 lakh**

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3. BACKGROUND INFORMATION

3.1 General

3.1.1 Kerala is blessed with a coastline of 590 km and having extensive brackish water lakes and estuaries. With a total fishermen population of more than 14 million and rich marine and inland water resources, fisheries and aquaculture forms an important sector with regard to activities in the state. Kerala occupies a premiere position in Indian fisheries by contributing about 13% of the marine landings fishing industry which has employment, livelihood, and food security of the country. The state has been a pioneer in introducing several innovative measures in harvest and post-harvest technologies in India. The technological advancements in fisheries have considerably influenced the fishing zone substantially in the last four decades with the continuous intensification of the fishing effort contributes significantly to economic, social and nutritional wellbeing of the people.

3.1.2 Fishery industries occupy an important role in the economy of Kerala. The export of fish products from Kerala worth approximately Rupees 6971 Crore, making it 12% share of India in value and 13% in quantity.

3.2 Fisheries sector in Kerala at a Glance

3.2.1 A brief outline of the fishery details of Kerala state is given below:

- 590 km Coastline
- 222 Marine and 113 Inland Fishermen Villages
- 10.54 Lakh Fishermen Population
- About 6.01 Lakh Metric Tonne Marine Fish Production
- About 15% Share in India’s Total Annual Marine Fish Production

3.3 Fisheries Infrastructure in Kerala

3.3.1 Construction and commissioning of a number of fishery harbours and landing centres, introduction of new generation fishing craft and gears - both in the traditional and mechanised sectors, NCDC assisted motorisation programme for

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traditional craft implemented by Matsyafed (Kerala Government undertaking), various social welfare measures taken to improve the living standards of fishermen like housing, roads, water supply schemes, fisheries schools etc, have brought considerable development to the fisheries sector of the state during the last decades. Out of the 25 fishery harbours in the state, 22 are operational and balance 3 are at various stages of construction. All harbours constructed in the state are by the Harbour Engineering Department. The detailed status of the Fishery Harbours in Kerala is given below:

Table 3.1 List of Fishing Harbours in Kerala State

No	Harbour	Nature	Location	Remarks
1	Vizhinjam	Mechanised	Thiruvananthapuram	Operational
2	Muthalapozhy	Mech. & Traditional	Thiruvananthapuram	Completed
3	Thangassery	Traditional	Kollam	Completed
4	Neendakara	Mechanised	Kollam	Completed
5	Chethi	Mech. & Traditional	Alappuzha	Work in Progress
6	Arthungal	Mech. & Traditional	Alappuzha	Work in Progress
7	Thottappally	Mechanised	Alappuzha	Completed
8	Kayamkulam	Mech. & Traditional	Alappuzha	Completed
9	Munambam	Mech. & Traditional	Ernakulam	Completed
10	Chellanam	Mech. & Traditional	Ernakulam	Completed
11	Chettuva	Mech. & Traditional	Thrissur	Completed
12	Ponnani	Mech. & Traditional	Malappuram	Completed
13	Thanur	Mech. & Traditional	Malappuram	Completed
14	Parappanangadi	Mech. & Traditional	Malappuram	Work in Progress
15	Beypore	Mechanised	Kozhikode	Completed
16	Puthiyappa	Mechanised	Kozhikode	Completed
17	Koyilandi	Mech. & Traditional	Kozhikode	Completed
18	Chombal	Traditional	Kozhikode	Completed
19	Vellayil	Mech. & Traditional	Kozhikode	Completed
20	Thalai	Mech. & Traditional	Kannur	Completed
21	Azheekkal	Mechanised	Kannur	Completed
22	Moplabay	Mech. & Traditional	Kannur	Completed
23	Cheruvathur	Mech. & Traditional	Kasargod	Completed
24	Kasargod	Mech. & Traditional	Kasargod	Operational
25	Manjeswaram	Mech. & Traditional	Kasargod	Completed

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3.4 Resource Potential

3.4.1 According to the available estimates of potential fishery resources of the West Coast, particularly in the south-west coasts, Kerala possesses the richest fishing grounds in the region. Studies estimate that about 8 Lakh metric tonne of marine fish can be sustainably harvested from Kerala waters.

3.5 Marine Fish Production

3.5.1 The actual landing efforts of the traditional craft are virtually confined to 0 to 20 m and mechanised craft up to 50 m. The present level of marine fish production in the state is about 6 lakh tonnes per annum. Hence about 2 lakh tonnes of fish within the maximum sustainable yield is still left un-harvested.

Table 2.2 Marine Fish production of Kerala through 2011-12 to 2021-22

Year	Production in Lakh T
2011-12	5.53
2012-13	5.31
2013-14	5.22
2014-15	5.24
2015-16	5.17
2016-17	4.88
2017-18	4.84
2018-19	6.09
2019-20	4.75
2020-21	3.91
2021-22	6.01

3.5.2 This can be harvested only by increasing the number of fishing days, by providing safe landing facilities, improving the fishing gears, improving the operating range of vessels by providing safe berthing facilities wherever possible.

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3.6 Shore Based Facilities

3.6.1 Shore based facilities like ice plants, cold storages etc., are available all along the coastal region. Rigorous fishing activities are already going on in and around the fishing villages of the state.

3.6.2 The shore-based facilities now available at Thiruvananthapuram district will be capable to take care of the additional landing due to up gradation of the fishery harbour. A well-developed road network connecting the coastal belt and the hinterlands makes the transportation of fish and fish products easier. Railways also play a major role in the transportation of fish products.

3.7 Fish Marketing

3.7.1 Fish, Prawns and other High Value Catches are usually auctioned at the local centres immediately after landing. Local private agencies collect most of the prawn for processing. High Value Catches landed will be allocated to export market and about 80% of the rest of the fish landed is taken to the inland markets. The financial institutions in the area as well as co-operative bodies provide financial assistance for marketing.

3.8 Ownership and Management of fleets

3.8.1 Individuals or fishermen groups own traditional as well as mechanized crafts in most of the cases. Matsyafed plays a prominent role in coordinating the entire fishing activities in the fishing villages. Banks and societies also provide financial assistance for the repair of the vessels, purchase of OBMs, fishing gear and other capital investments.

3.9 Fishery Development Programmes

3.9.1 For the proper planned development of fishing industries in Kerala, modernization of existing crafts, introduction of new generation crafts, processing and marketing, landing and shore-based facilities are essential prerequisites.

3.9.2 Basic need for fishing operation either in mechanized or artisanal sector is a sheltered harbour basin, and adequate berthing and anchoring facilities. Kerala is

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much ahead in providing these facilities. By now 21 fishery harbour projects are completed and few projects are progressing.

3.9.3 This has brought a sizable income to the fishermen community and the social status has improved very much during the past two decades. Now the focus of the Government is to complete the projects already started, expand the existing one to meet the present day demands and also to improve the facilities in the existing harbours to international standards. State Government is adopting a comprehensive approach towards this, which includes improvement of hygienic standard, providing adequate post-harvest infrastructure and cold storages, facilities for fish processing and value addition.

3.10 Fishing Activities in the Project Region

3.10.1 The general background information regarding the coastal areas of the district is summarised below.

Table 3.3 General Background Information

Kasaragod District		
1	Length of coastline	70 km
2	% Coastline of Kerala state	11.86 %
3	Fish Landings per Year	35163 T
4	% Landings of Kerala State	4.38 %
5	Total Fishermen Population 2022-2023	45919
	Male	18548
	Female	17129
	Children	10206
	Active Fishermen	10928

(Source: Fisheries Guide 2023, Fisheries Department, Kerala)

3.11 Fishing Villages

3.11.1 The details of major marine fishing villages of Kasargod district are given below

Table 3.4 Major marine fishing villages of Kasargod district

KASARGOD DISTRICT (16 Nos)			
Sl. No.	**Name of Fishing Village**	**Revenue Village**	**Panchayath**
1	Thrikaripur	Valiyaparambu	Valiyaparambu
2	Valiyaparambu	Valiyaparambu	Valiyaparambu

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3	Padannakadappuram	Padanna	Valiyaparambu
4	Thaikadappuram	Neeleswaram	Neeleswaram
5	Kadangode	Cheruvathur	Cheruvathur
6	Poonjakadappuram	Kanhangad	Kanhangad
7	**Hosdurg**	**Hosdurg**	**Kanhangad**
8	**Ajanoor**	**Chithari**	**Ajanoor**
9	**Pallikkara**	**Pallikkara**	**Pallikkara**
10	Kottikulam	Uduma	Uduma
11	Kizhoor	Kalanad	Chemmanad
12	Kasaba	Kasaragod	Kasaragod
13	Kavungoli	Kudlur	MogralPuthur
14	Koyippady	Koyippady	Kumbala
15	Shiriya	Mangalpady	Mangalpady
16	BengaraManjeswar	Hosabettu	Manjeswar

3.12 Benefited Population:

3.12.1 The population of Hosdurg, Ajanoor and Pallikkara fishermen villages is the direct beneficiaries of the project. Population details and fishermen statistics of these villages are shown below.

Table 3.5 Beneficiary Details

Sl. No	**Fishermen Village**	**Population**	**No. of Registered Fishermen**
1	Hosdurg	1575	354
2	Ajanoor	2965	793
3	Pallikkara	2554	991
Total		**7094**	**2138**
Fishermen statistics. Source: Fisheries Dept.			

3.12.2 Statistics of registered fishing crafts is shown in the table below.

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Table 3.6 Details of Fishing Vessels Registered at the Base

Sl. No	Fishermen Village	No. of Fishing Crafts		
		Motorised Non Mechanical	Motorised Mechanical	Non Motorised
1	Hosdurg	165	41	9
2	Ajanoor	207	4	13
3	Pallikkara	181	5	8
	Total	**553**	**50**	**30**
Source: ReAL Craft Portal, Dept of Animal Husbandary, Dairying and Fisheries, GoI				

3.13 Marine Fishery Potential of the Kasaragod Region

3.13.1 The annual landings of Kasaragod District during 2003 to 2022 are given below.

Table 3.7 Annual Landings of Kasaragod District

Year	Landings (Tonnes)
2013-2014	38382
2014-2015	51902
2015-2016	45418
2016-2017	28689
2017-2018	52224
2018-2019	35163
2019-2020	12364
2020-2021	19259
2021-2022	20123

(Source: Fisheries Guide 2023, Fisheries Department, Kerala State)

3.14 Fish Marketing

3.14.1 The fish landed are generally auctioned at the auction hall and the local vendors take the fish to export and inland markets. There is a well-developed road network to take the fish to all major inland markets. The site is easily accessible from major roads through a network of coastal roads.

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4. MATHEMATICAL MODEL STUDY

4.1 General

4.1.1 Harbour Engineering Department entrusted the model study for constructing an open sea fishery harbour at Ajanur, and river training work of Chihari River near the harbour to CWPRS Pune.

4.1.2 The CWPRS conducted model study and recommended layouts based on the study. It was decided to construct two rubble mound breakwaters of 1150m at the northern side and 425m at the southern end providing a tranquil basin inside the harbour. The northern breakwater of the harbour also acts as river training on one side of Chithari River. Rubble mount breakwater of length 435m is proposed on the other end of the river for river training work. Also, shore protection work needs to be carried out at the foot of the southern training breakwater. They also conducted desk and wave flume study and recommended the optimum cross-sections for the breakwaters.

4.2 Tidal Levels and Currents

4.2.1 The proposed site of development is about 25 km south of Kasargod. Important tidal levels at Kasargod with respect to Chart Datum are reported to be as under:

- MHHW : 1.4 m
- MLHW : 1.3 m
- MSL : 1.0 m
- MHLW : 0.9 m
- MLLW : 0.4 m

4.2.2 This indicates that the maximum tidal range at the study area is of the order of 1.0 m. Tidal currents are generally parallel to the coastline and directed northward during flood as well as ebb tide with the maximum magnitude of the order of 0.4 m/s.

4.3 Sediment Characteristics

4.3.1 Bed samples were collected from different locations at the proposed site at Ajanur. Based on the analysis of the bed samples, the bed material in the vicinity of the proposed site is mainly composed of medium to fine sand and silt, whose mean grain size, D_{50} varies from 0.05 mm to 0.6 mm.

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4.4 Modelling Techniques

4.4.1 Mathematical models; MIKE 21 SW and LITPACK, were used for the simulation of near shore wave field and long shore transport near the proposed fishery harbour at Ajanur.

4.5 Wave Conditions

4.5.1 The input wave conditions used for the wave tranquillity studies are given as follows.

Table 4.1 Input wave conditions studied

Incident Wave Direction	Incident Wave Height (m)
SSW	1.5
SW	2.0
WSW	2.5
WEST	2.5
WNW	1.5

4.6 Littoral Drift

4.6.1 The general orientation of the coastline at the proposed site is NW-SE making an angle of about 335^{0}with respect to north. Further, depending on the wave direction with respect to the coastline, the littoral drift will be either directed northward or southward along the shoreline. The model was simulated for the cross-shore profiles for the seasonal and the annual wave climates.

4.6.2 Annual and seasonal net and gross littoral drift were estimated using LITDRIFT model. The northward and the southward drift are calculated based on the gross and the net littoral drift. The littoral drifts are reported in the following table:

Table 4.2 Transport Rates (million cum)

Period	Northward	Southward	Net	Gross
SW monsoon	0.0795	0.511	-0.431	0.590
NE monsoon	0.021	0.016	0.0057	0.037
Non-monsoon	0.025	0.025	0.0	0.05
Annual	0.118	0.531	-0.413	0.649

4.6.3 The net transport is towards south. It is also observed that the major southward transport occurs during SW monsoon.

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4.7 Shoreline Evolution

4.7.1 The model was run with the schematic layout for a period of 10 years. As the net transport is directed towards south, the deposition on the north side of the extended groyne is noticed while on the southern side erosion is observed.

4.7.2 Further, model was simulated subsequently for a period of 2, 4, 6, 8 and 10 years and the maximum cross-shore advancement for each period would be obtained as 34 m, 44 m, 52 m, 60 m and 68 m respectively from the prevailing coastline position on the northern side of the proposed north breakwater. Further, the corresponding long shore effect of deposition was felt for a length of about 2500 m. The maximum cross-shore erosion of the shoreline in 10 years period would be of the order of 40 m south of the southern breakwater with long shore effect would occur upto about 1500 m from the proposed position of the southern breakwater.

4.8 Conclusions of Study

4.8.1 The final layout for the fishing harbour was decided based on the layout options proposed based on wave tranquillity study. An open sea harbour with north breakwater of 1150 m length and south breakwater of 425 m length is adopted as the final layout.

4.8.2 The net long shore transport is towards south. Also, the major southward transport occurs during SW monsoon. Deposition is expected on the north side of the proposed northern training wall. The corresponding long shore effect on northern side of the proposed northern breakwater would be felt up to 2500 m.

4.8.3 In 10 years period, erosion on the southern side of the proposed southern breakwater would be limited up to 40 m in cross-shore direction and its effect in longshore direction would be extended up to 1500 m in the south of the proposed southern breakwater.

4.8.4 The sedimentation pattern for the proposed condition shows sedimentation of the order of 0.045m per annum near the river mouth. Sedimentation is also noticed near the north and the south breakwaters (0.05 m in a year). In the fishing harbour area sedimentation of about 0.03 m in a year is estimated.

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4.8.5 If the erosion on the south side of the proposed fishing harbour is progressive after the development then a suitable shore protection measure in the form of a seawall or series of groynes may be provided.

4.8.6 If the shifting of the river mouth is pronounced after the proposed development of the river training works then a seawall of appropriate length may be provided to arrest the shifting of the river mouth.

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5. SMART INFRASTRUCTURE AND AUTOMATED SYSTEMS

5.1 Introduction

The Third Industrial Revolution or Digital Revolution refers to the technological progress from analogue circuits and mechanical devices to the digital technology we use today. In the late 1990s and 2000s, the Information Technology (IT), with its high performance and low cost of computers and high capacity and speed of communications such as the Internet, contributed greatly to the efficiency and globalisation of transactions. In the 2010s, IT has shifted to the Information and Communication Technology (ICT), emphasizing the importance of communication technology between people and between people and things, and the sharing of information and knowledge through network communication. ICT includes not only traditional communication devices such as PCs and smartphones, but also the Internet of Things (IoT) and the use of big data. Advances in the Third Industrial Revolution have made human intellectual work more efficient.

The Fourth Industrial Revolution is characterised by emerging technological innovations in areas as diverse as robotics, AI, nanotechnology, biotechnology, quantum computing, IoT, 3D printing and virtual reality. In recent years, the widespread use of the Internet and high-speed communications in all areas of the industry, society and life has led to the connection of people through PCs, smartphones and tablets, and also to the connection of things through the IoT. In addition, services with a variety of applications are becoming more readily available. In particular, developments in robotics and AI technology have the potential to change the way we work. The Digital transformation (DX), the concept that digitization changes social life, the economy and business for the better, is being promoted.

5.2 Objectives and effects of ICT and IoT utilization

Electronic auctions have long been widespread in fishing harbour markets, and online auctions are now available from anywhere in the world, without the need to visit the market. The website of the fishing harbour provides not only information about the auction, but also about the restaurants in the harbour and its surroundings. Good information spreads quickly through social networks. The number of personnel at the auction hall is also decreasing. There are PCs in the administration office, and

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communication with buyers and masters or owners of fishing boats is done via the internet rather than by telephone. Automatic sorting and grading machines are used for certain species of fish, as it is difficult to sort and grade fish manually. ICT, IoT utilization refers to the computerization of information from paper form to electronic form and the internet of people and things. In this way, ICT, IoT utilization can be seen in the operation of fishing harbours, and the use also seems to be reaping the benefits of these technologies.

The followings are the objectives and effects for which ICT and IoT are used so that fishing harbours can fulfil their roles and functions properly:

i Ensuring transparency, parity and fairness;

Dissemination of information via the internet & website, etc.

ii Efficiency in sales operations;

Weighing scale, sorting & grading machine, electronic auction, etc.

iii Maintaining and increasing sales;

Greater participation of buyers, including from outside the local, through electronic and online auction

iv Ensuring safety and quality;

Labelling, electronic record for the HACCP system, etc.

v Ensuring resource management;

Electronic recording and reporting catch and sales information, etc.

vi Ensuring traceability and sustainability;

Electronic issue of invoices and labelling, etc.

vii Improving safety of navigation and fishing operation; and

Electronic information, etc.

viii Efficiency in financial management, etc.

Electronic record

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5.3 Dissemination of information via the internet & website

A fishing harbour is the base of the fishing industry, where the catch is landed and sold, and where processing and distribution are concentrated. People involved in the fishing industry want to be able to access information about the fisheries, the fishing industry and the fishing harbour. On the other hand, the administrator and operator of the fishing harbour and market are required to ensure transparency, fairness and equity in their administrations and operations. These imply the importance and necessity of disclosure and provision of information.

5.3.1 Internet & website

As a method of disclosure and provision of information, it is appropriate to make use of ICT, which is widely used in industry and daily life. The administrator and operator use the internet to set up a website, post information on the website, and make the information available to users. Confidential information, which is inappropriate for disclosure and which identifies the user, can be made accessible only to users who registered in advance and enter your ID and password in the dedicated login.

5.3.2 Contents of information

The information provided on this site is broadly classified into the following categories: information about the Harbour Authority, information about the fishing harbour, information about the fishing industry, information about the market, information about safety and quality of fish and fishery products and other useful information. The users of the information include fishermen, buyers and other traders, processors, transporters and suppliers of ice and oil. Depending on the nature of the information provided, the users of that information also differ.

In the case of a harbour authority setting up a website, the following is a list of appropriate contents of the information:

1 Harbour administration’s information

- Mission
- Organization (Organizational structure, board members, staff)
- Documents (Annual financial plan and report)

2 Harbour information

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- Roles or functions (Roles or functions of harbour and market)
- History (History, development of harbour)
- Layout of harbour facilities (Breakwaters, quays, waterways, basins, handling hall, auction hall, administration office, freezing and refrigeration facilities, buyer's warehouses, parking lots, fishing vessel building and repair yard, fishing gear drying ground, processing factories, logistic terminal, etc.)
- Hinterland (Fishing communities or town)
- Harbour services (Landing fish, idling vessels and preparing for fishing, cranes and hosts for fish landing, fishing vessel building and repair yard (boatlift, slipway, dry dock), ice supply, water supply and fuelling, lending and collecting fish boxes, fuelling facilities, etc.)
- Rules for use of harbour facilities and services

3 Fisheries information

- Types of fisheries (Fixed-net fishery, purse sein fishery, trawl net fishery, etc.)
- Fishing fleet (Overhaul length, horsepower, gross tonnage, types of fisheries, fishing grounds, etc.)
- Fish and fishery products (Fish caught, landed or unloaded, auctioned, processed fishery products)
- Fishery product processing and marketing

4 Sales information

- Collection of landings (i.e. landing station or landing point)
- Auction (How the auction works, landing times, auction days/times).
- Fishermen (Register (ID and password), How you can provide landings information. fees and charges, rules and forms)
- Buyers (Register (ID and password), How you can buy fish at the auction. fees and charges, rules and forms)
- Expected landings (Catch method, species, grade, volume (number of boxes), download or print out of PDF, Excel file or CSV file)

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- Today's sales catalogue (Fishing boat's name or number, catch method, species, grade, volume (number of boxes), download or print out of PDF, Excel file or CSV file)

- Prices (Sales date, fishing vessel, species, grade, volume (number of boxes), maximum prices, average prices, download or print out of PDF, Excel file or CSV file)

- Services (Sorting, grading and weighing, ice supply, clean water supply, fish boxes, packing and shipping purchased fish and fishery products)

- Documents (Invoices, landing statements, etc.)

5 Safety and quality of fish and fishery products

- Quality management

- HACCP system (Videos and photos)

6 Fish resource management

7 Fisheries statistics

- Weekly, monthly and yearly landings

- Download or print out of PDF, Excel file or CSV file

8 News & topics

9 Practical information

- Meteorological and oceanographic information

- Traffic information

10 Contact

5.4 ICT, IoT-utilized sales

5.4.1 Recording, reporting and transmitting information on the catch and trade

Figure 6.1 shows the EU and US system for recording, reporting and transmitting information on the catch and trade of fish and fishery products to ensure fisheries resource management. An auction hall located at a fishing harbour is the first sale point where fish and fishery products received from producers are sold to buyers (processors or distributors), and is the only place (database) where catch and sale information can be accurately recorded.

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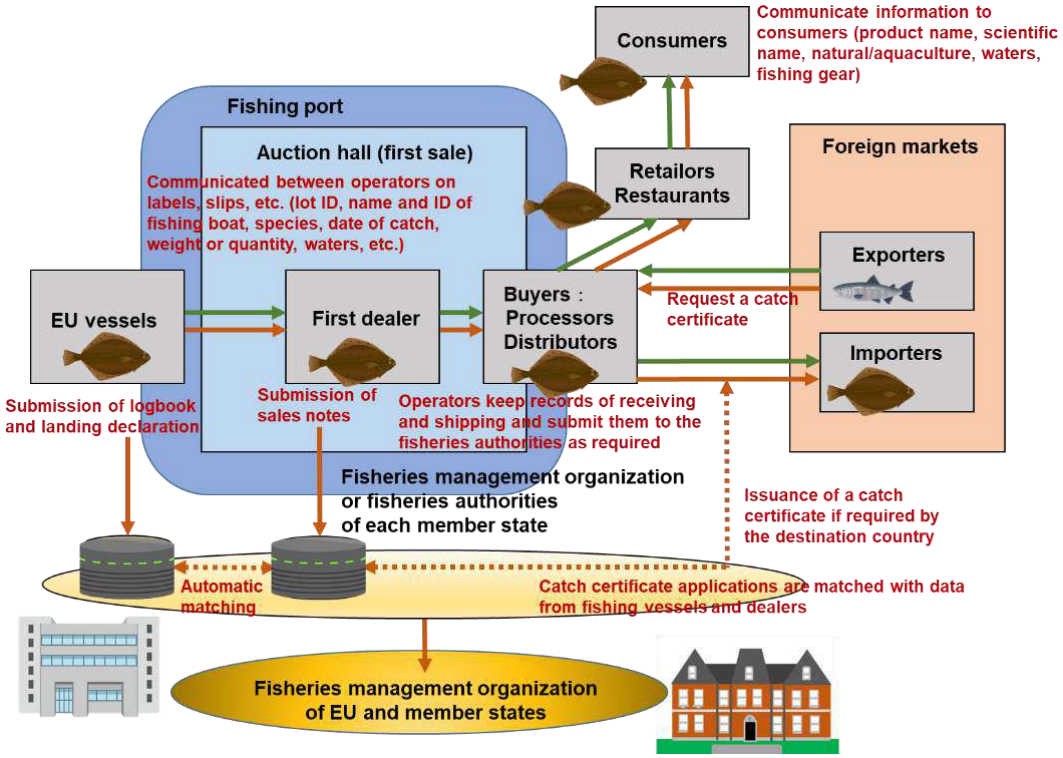


Figure 6.1 EU system for recording, reporting and transmitting information on the catch and trade

Figure 6.2 shows how ICT and IoT are utilized in the EU system. ICT, IoT utilization in sales means not only the electronic auction, but also the entire process of reporting catch information to the fisheries authorities and providing it to the market, landing at the fishing harbour and bringing it into the market, washing, sorting & grading, weighing, auctioning, delivery, shipping, issuing invoices (landing statements) to producers and bills (sales notices) to buyers, and reporting the results of sales (sales notes) to the fisheries authorities (or fisheries management organization).

The key to this computerization is a database in which the information on catch and sales is automatically recorded, through the electronic auction. Documents such as sales notices and the reports such as sales notes can be automated by pulling the necessary information from the database. The database can also facilitate the issuance of catch certificates and the provision of traceability information, which is necessary when exporting fish and fishery products, with a high degree of reliability and speed.

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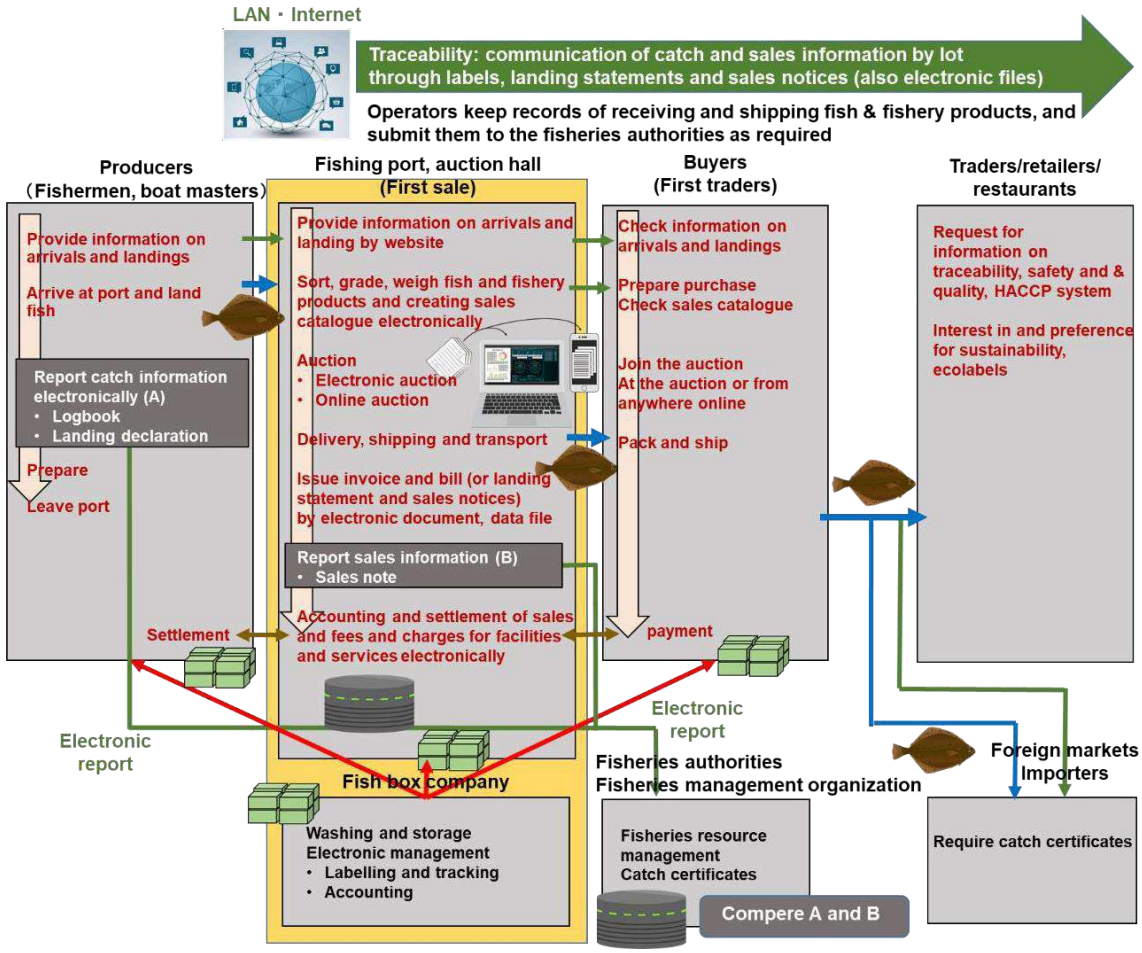


Figure 6.2 EU system utilizing ICT, IoT

5.5 ICT, IoT utilization according to sales process

5.5.1 Arrival of fishing vessels and landing information

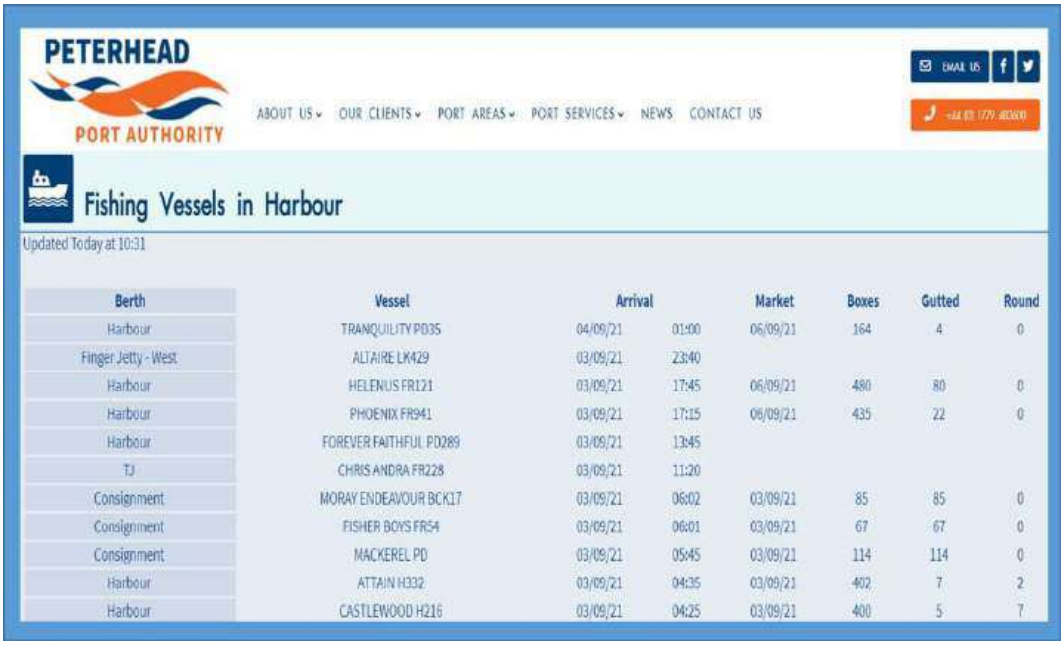
Information on the date and time of arrival of fishing vessels and the landings is transmitted from the fishing vessels to the auction hall via the fishing vessel owner's office by telephone or internet the day before the sale or by the time of the auction. In some cases, reports to the fisheries authorities (or fisheries management organization) are also provided by the fishing vessels to the auction hall via the internet. Small fishing vessels operating day-trip coastal fishing catch a small quantity and variety of fish. So, small fishing vessels are not required to provide landing information to the auction hall. However, when the fishing vessels have catch larger than usual, they provide landing information to the auction hall by mobile phone.

The fishing vessels arrival information includes the fishing vessel's name, the date and time of arrival, the expected date of sale, the species of fish and the number of fish

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boxes or the catch. Landing information includes the name of the fishing vessel, species, grade, the number of fish boxes or the catch and also information on the species eligible for ecolabel fishery certification. This information is uploaded to the website, posted in the waiting & resting room for buyers, etc. of the auction hall. Figure 6.3 shows an example of providing arrival of fishing vessels and landing information on the website wet up by the Harbour Authority.



Berth	Vessel	Arrival		Market	Boxes	Gutted	Round
Harbour	TRANQUILITY PD35	04/09/21	01:00	06/09/21	164	4	0
Finger Jetty - West	ALTAIRE LK429	03/09/21	23:40				
Harbour	HELENUS FR121	03/09/21	17:45	06/09/21	480	80	0
Harbour	PHOENIX FR941	03/09/21	17:15	06/09/21	435	22	0
Harbour	FOREVER FAITHFUL PD289	03/09/21	13:45				
TJ	CHRIS ANDRA FR228	03/09/21	11:20				
Consignment	MORAY ENDEAVOUR BCK17	03/09/21	06:02	03/09/21	85	85	0
Consignment	FISHER BOYS FR54	03/09/21	06:01	03/09/21	67	67	0
Consignment	MACKEREL PD	03/09/21	05:45	03/09/21	114	114	0
Harbour	ATTAIN H332	03/09/21	04:35	03/09/21	402	7	2
Harbour	CASTLEWOOD H216	03/09/21	04:25	03/09/21	400	5	7

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LATEST FISH LANDINGS

Vessel	Total Boxes	Cod	Monks	Haddock Lrg/Med	Haddock Sml	Haddock Sml Round	Whiting	Whiting Round	Saithe	Megrim	Squid	Hake	Lemons	Plaice	Witches	Ling	Others
PHOENIX FR941	435	17	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3
				124	206		13		14			53		3			
HELENUS FR121	480	20	0	0	0	0	20	0	0	0	0	0	0	0	0	5	35
				40	270				20			65		5			
TRANQUILITY PD35	164	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
					6	150						1		3			
SHALIMAR PD303	852	110	10	0	0	0	0	110	0	2	0	0	4	0	5	3	30
				65	355	25	25		55			50		3			
FALCON H119	861	89	7	0	0	0	0	110	0	4	0	0	3	0	3	5	55
				80	360	34	30		35			40		6			
VICTORIA MAY SF267V	715	65	130	13	13	15	0	3	281	0	0	12	0	0	0	38	145
EMULATOR SH83	193	111	9	0	0	0	2	0	0	0	0	0	4	0	2	1	11
				4	6				31			1		11			
STEADFAST HOPE BF340	190	15	30	0	0	0	10	55	0	0	0	0	0	0	10	2	3
					45				20								
Totals	3890	427	188	13	13	15	36	278	281	6	0	12	11	0	20	54	282
				313	1248	209	68		175			210		31			

MSC fish are shown in blue or shaded boxes. Vessels are responsible for the declaration.
Responsible Fishing Scheme certified vessels are highlighted in yellow.

Source: https://www.peterheadport.co.uk/

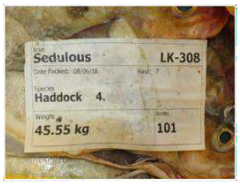
Figure 6.3 Arrival of fishing vessels and landing information, Peterhead, UK

5.5.2 Landing and bringing in the auction hall

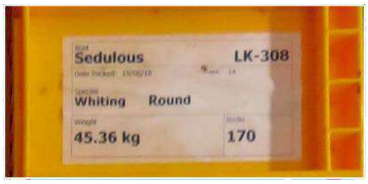
On the day before or on the day of the scheduled sale, the fish are removed from the hold in fish boxes using cranes on board or on the quay and brought in the main building of the auction hall on forklifts or trolleys. Floating fish (pelagic fish) are taken directly from the hold to the tanks on the quay or into the main building by fish pumps or nets. The fish boxes and tanks are placed in a cold controlled area soon after landing to ensure freshness.

Figure 6.4 shows the labels on the fish boxes landed at Lerwick and Scalloway. The fish has already been sorted and weighed on board before landing and includes information such as fishing vessel's name, species and weight by fish box.

Figure 6.4 Labels attached to the fish boxes landed at the quays, Lerwick & scalloway, UK



Label in the fish box



Label attached to the fish box



Landing and bringing into the main building of the auction hall

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5.5.3 Sorting, Grading, Weighing fish and creating sales catalogue

5.5.3.1 Sorting and grading

Catch may be sorted, graded and weighed on board (depending on the species, primary treatment such as gutting may be also carried out on board), and a label with their results (fishing vessel's name, catching area, species, grade, weight, etc.) attached to the fish box, as shown in Figure 3.4. The content of the label attached to the fish box is scanned and additional information such as the quality level added from a tablet/PC terminal. Even if fish are weighed in advance, the information on the label may be incorrect or the label may be unclear, and in order to ensure traceability with accurate information, fish are weighed on a sample basis by fishing boat, species and grade for check.

In the case where the catch has not been sorted, graded and weighed on board, the automatic fish species sorting machine may be used for horse mackerel and other species and the automatic fish grading machine may be used for flatfish, flounder, skipjack, salmon, etc.

Figure 6.5 shows the automatic grading machine at Scalloway, UK, and Figure 6.6 shows other examples.



Figure 6.5 Automatic grading machine for flatfish, Scalloway, UK



Grading machine for salmon
Ishinomaki, Japan



Grading machine for ??
Tarragona, Spain

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Figure 6.6 Other examples of automatic grading machines

5.5.3.2 Weighing and creating sales catalogue before auction

The fish box with fish in is placed on the weighing terminal and the catch information such as the fishing vessel's name and number, start and end dates of catch, catch area, and fishing method is entered from the panel of the weighing terminal as shown in Figure 6.7. The information such as species, grade in size, condition (fresh, frozen, etc.) and quality level and eco-label certification is also entered. The information is automatically sent to the server at the time of weighing, resulting in printing a label containing the information, which is posted on the side of the fish box or placed in the fish box. It is relatively easy to create a sales catalogue by drawing the necessary data from the server.

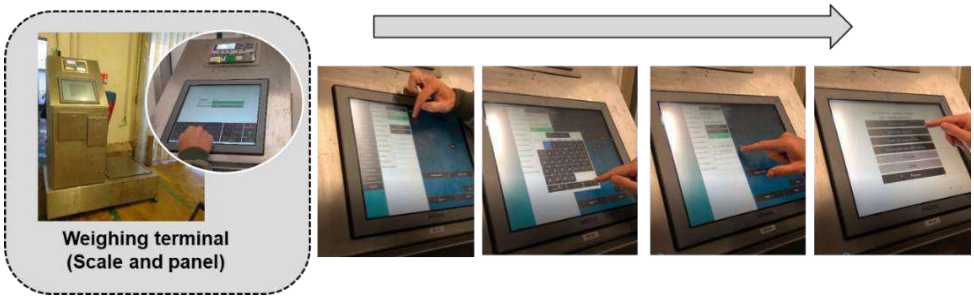


Figure 6.7 Weighing terminal, Boulogune-sur-Mer, France

The sales catalogue may be created by entering the information on the labels or slips (small sheets of paper) in the fish box from a tablet/PC terminal as shown in Figure 6.8. As most of the necessary information about the fish is defaulted, has to be actually entered from the weighing panel, or tablet/PC terminal. Sales catalogues are printed out and distributed to buyers, or pre-registered buyers can log in to the website to view, print out or download (as a PDF file).

Figure 6.9 shows the forklift with a tablet-mounted weighing scale and fish tanks with IC tags at Ofunato, Japan. RFID tags are attached to the fish tanks, one at the front and the other at the back of the tank. The weighing results by using a forklift weighing scale are linked to the tank number read from the RFID tag and sent to the server for recording. A tank of seawater or ice is pre-weighed and then the tank is weighed with the fish in it. By subtracting the weight of the former from that of the latter, the net weight of the fish is obtained.

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Figure 6.8 Creating sales catalogue, Skagen, Denmark

Figure 6.9 shows other examples of weighing scales with ICT, IoT utilized.



Figure 6.9 Forklift with tablet-mounted weighing scale and fish tanks with IC tags, Ofunato, Japan

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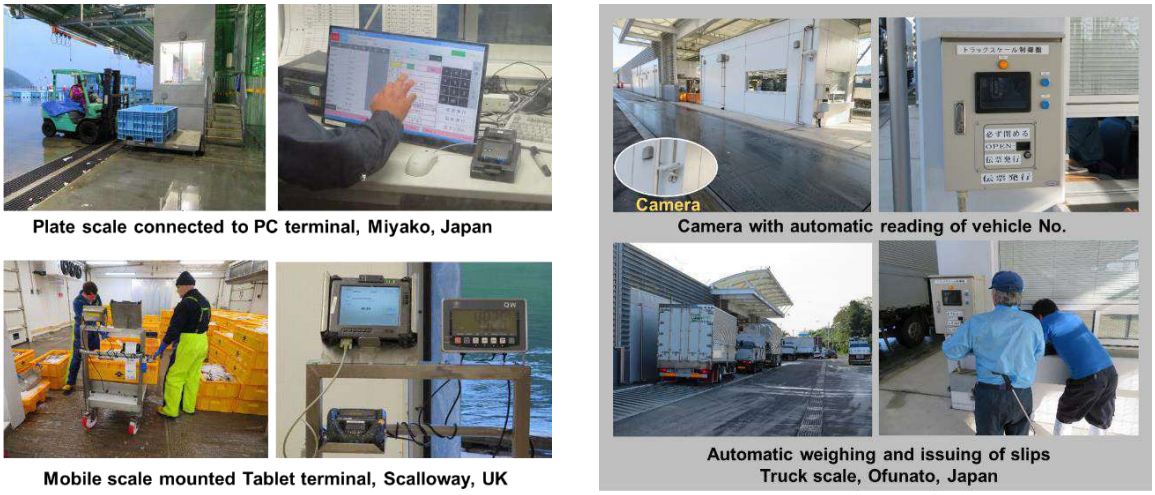


Figure 6.10 Other examples of weighing scales with ICT, IoT utilized

5.5.3.3 Weighing and creating sales catalogue in the course of auction

Fish boxes with fish in by fishing vessel are placed on the conveyor belt moving to the auction area. When the fish box reaches the scale on the conveyor belt, it is automatically weighed. Figure 6.11 shows the weighing and creating a sales catalogue at Lorient-Keroman, France. Market personnel enter the information about the fish other than the weight, resulting in creating a sales catalogue. The information for sale is shown on the screen or electronic display in the auction hall.



Figure 6.11 Weighing and creating a sales catalogue, Lorient-Koroman, France

Figure 6.12 shows the weighing and creating a sales catalogue while fish boxes with fish in are moving on the conveyer belt at Civitanova, Italy. In the cabin near the auctioneer, information such as the fishing vessel's name and number, catch area,

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species, grade in size, condition and quality level other than the weight are entered from a PC terminal, and a sales catalogue is created. The video footage of the fish and information for sale are shown on the screen in the auction hall. The auctioneer announces the quality of the fish to the cabin and the auction for each sales lot begins.



Figure 6.12 weighing and creating a sales catalogue while the products are moving on the conveyor belt, Civitanova, Italy

5.5.4 Auction

5.5.4.1 History of electronic auction

Electronic auction was first introduced in the late 1980s to save labour and time, improve efficiency and avoid manual errors. In the 1990s, PCs became more sophisticated and network connections, such as LANs, were used for more sophisticated work. The opening of the Internet, developed in the United States, to the private sector accelerated informatization, and from the mid-1990s the Internet spread rapidly throughout the world, enabling the instantaneous and interactive exchange of a large amount of information. Moreover, the development and widespread use of mobile phones has made it possible to exchange information from any location. This has led to the introduction of online auctions, where buyers from all over the country and the rest of the world can participate via the internet. The number of markets conducting online auctions has increased since 2000 due to the widespread availability of broadband and

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also the increasing use of smartphones in the 2010s. A web-based transaction system has also been launched.

As buyers may participate in the auction from all over the world, it is a prerequisite that a quality assurance system for fish and a delivery system from the auction hall are in place. For the quality assurance system, there are EU quality criteria and more detailed criteria set up by Scandinavia and other exporting countries. As for the delivery system, it must be punctual and ensure a cold chain up to the buyer's designated destination. The Nordic and Scottish markets, such as Norway, Denmark, the Faroe Islands and Shetland (UK), meet these requirements, and rely heavily on online auctions.

5.5.4.2 Classification of auctions in terms of the utilization of ICT, IoT

Auction is a very old tradition of selling or buying of products and services which allows the highest bidder to get hold of them. According to the extent to which ICT, IoT is used for computerization, automation and systematization of the auctions, they are classified as follows:

1 Conventional auction/manual auction (local auction/physical attendance auction);

The auctioneer starts the auction with a shout in front of the fish. In the case of an ascending auction, the buyer voices the price or indicates it with his finger. In the case of a descending auction, the auctioneer shall state the price and the buyer shall respond to it by voicing or gesturing.

2 Electronic auction (local auction/physical attendance auction);

Computers have been introduced to automate and systematize the auctioneering process. The information about the fish is displayed on an "auction clock" - electronic board or screen - , and the buyers join the auction while looking at the fish. The buyer presses a key on a remote control or pad at the price he wants to buy. A computer network (LAN), has been set up, with wireless or wired connections between server, computers, remote controls and terminals. The information converted into database as the auction progresses would contribute to the automation and efficiency of the work that follows the auction, such as the issuance of invoices and sales notices.

3 Electronic auction (Online auction/internet auction/remote auction);

By connecting the auction hall’s computer network (LAN) to the internet, it is possible to participate in the auction in real time from anywhere in the world, without having to

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go to the auction hall (not physical attendance), as far as buyers have PCs, tablets or smartphones with an internet connection. It is also possible to participate in more than one auction or market simultaneously. This would lead to the more new buyers.

4 Electronic auction at the virtual market (first-price sealed-bid auction online); and

The virtual market is built in cyberspace and first-price sealed-bid auctions online take place. In the virtual market, the market in cyberspace, the producers (fishing vessels) at sea and buyers (processors) around the world are linked via the internet, and once each auction is completed, the fishing vessel goes directly from the fishing grounds to the processing plant designated by the buyer. In addition to the benefits of electronic auction, the separation of sales and logistics saves labor and time, and contributes to keep the catch fresh. On the other hand, it is noted that it is difficult to find a link with the function of fishing harbours.

5 Web transaction/negotiated transaction.

Via the internet, sellers and buyers negotiate with each other on the web and decide on items, prices and quantities in advance or at the auction.

With the utilization of ICT, IoT, auctions are held in different locations - display area, auction area, auction room, anywhere inside and outside the auction hall, virtual market.

5.5.5 Delivery, dispatch and transport

The fish auctioned off are checked by the market personnel for the contents of the labels in or on the fish boxes and are placed together in the designated area for each buyer, who has purchased them, where the fish are delivered from the market to the buyers. Then the fish are either dispatched from the auction hall by truck, carts or forklift as they are or, after packed.

The label contains catch and sales information that identifies the fish by lot, which is also necessary information to ensure traceability. Traceability information can be obtained in a variety of formats (PDF, Excel and CSV files) by reading it with a smartphone or other device from the barcode or QR code on the label on the fish box.

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Figure 6.13 and 6.14 show the labels and the information contained therein in or on the fish boxes at Giulianova, Italy, and at Gilleleje, Denmark respectively.

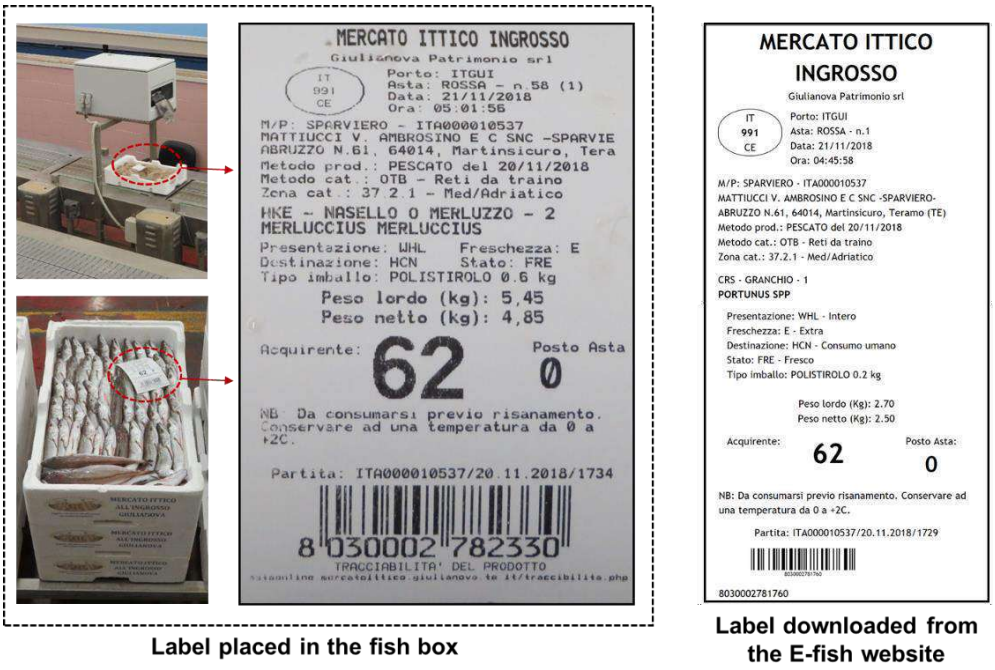


Figure 3.13 Delivery of fish with a label in the fish box, Giulianova, Italy

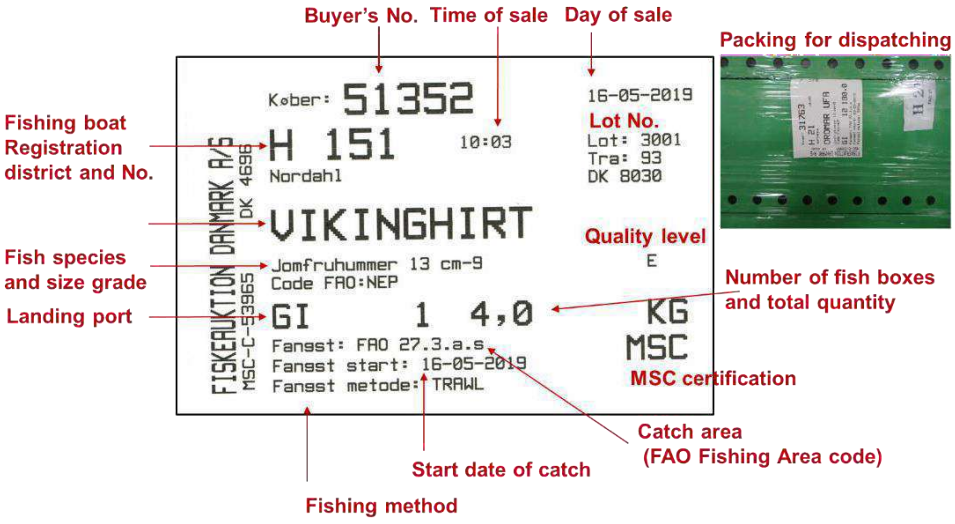


Figure 6.14 Delivery of fish fishery products with a label in the box, Gilleleje, Denmark

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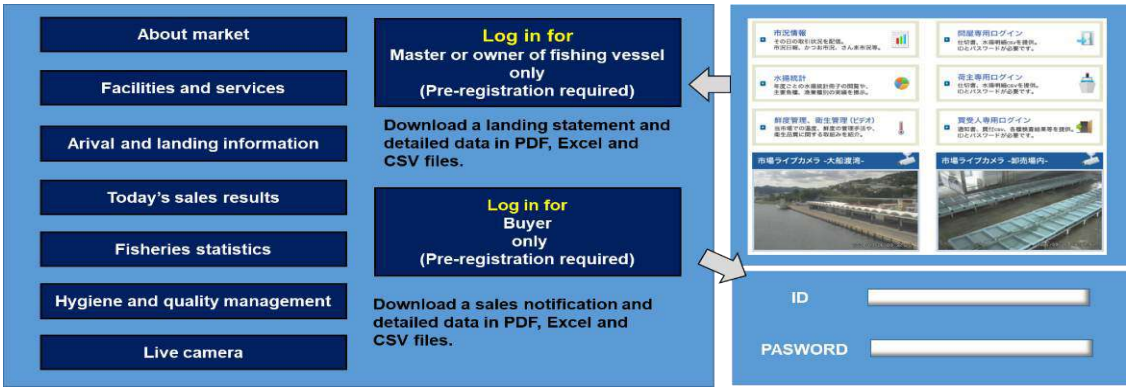
5.5.6 Issuing landing statements and sales notices

Information on the catch and sale is recorded electronically on the auction hall's server through the sales process. After the day's sales, landing statements to producers and sales notices (invoices) to buyers are automatically created by drawing necessary information from the server. A landing statement is a vessel-by-vessel list of which fish and have been purchased and by whom. A sales notice (invoice) is a bill for the fish purchased by the buyer.

Fishing vessel's owners or buyers receive these documents manually or electronically as follows:

- The market personnel print out the documents on paper and post them in the boxes of the buyers and the fishing vessel’s owners respectively;
- The personnel send the PDF file or other type of file to the buyers and the fishing vessel's owners by email; and
- Buyers and fishing vessel's owners log in the dedicated website to view and download them and detailed data in PDF, Excel and CSV files.

The day's sales results (fish species, grades, quality levels, prices, etc.) are uploaded on the website, soon after the auction.The landing statements and sales notices contain catch and sales information that identifies fish, and these documents can be recorded electronically by the vessel owners, buyers and market personnel to ensure traceability. Statistical information on the volume and value of sales by fish species and fishing method is reported monthly to the municipal and state statistical authorities and to the fisheries authorities. The accounting of commissions, charges, taxes associated with sales and other services is also computerized.

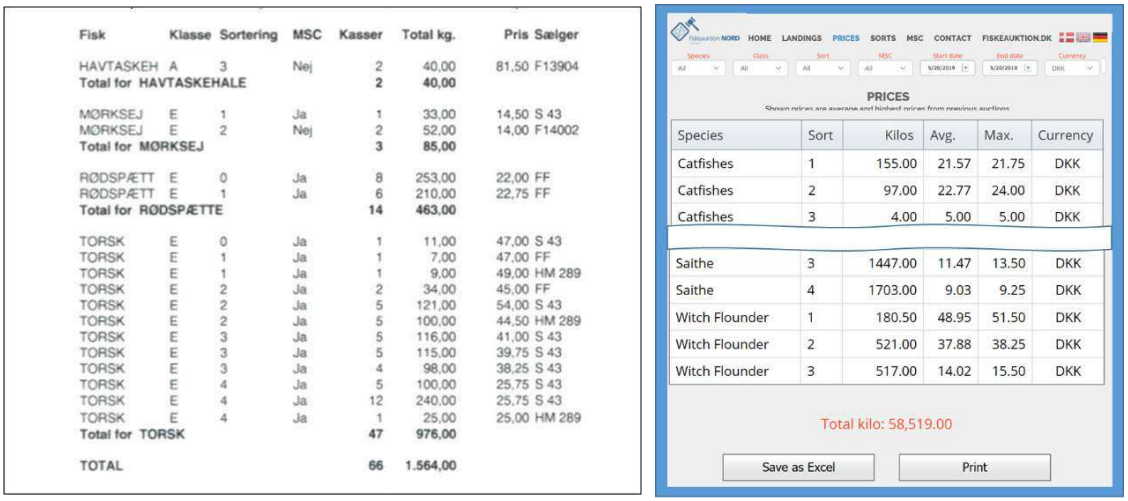


http://www.ofunato-fm.com

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Figure 6.15 Website for download of landing statements and sales notices, Ofuna, Japan



Fisk	Klasse	Sortering	MSC	Kasser	Total kg.	Pris Sælger
HAVTASKEH	A	3	Nej	2	40,00	81,50 F13904
Total for HAVTASKEHALE				**2**	**40,00**	
MØRKSEJ	E	1	Ja	1	33,00	14,50 S 43
MØRKSEJ	E	2	Nej	2	52,00	14,00 F14002
Total for MØRKSEJ				**3**	**85,00**	
RØDSPÆTT	E	0	Ja	8	253,00	22,00 FF
RØDSPÆTT	E	1	Ja	6	210,00	22,75 FF
Total for RØDSPÆTTE				**14**	**463,00**	
TORSK	E	0	Ja	1	11,00	47,00 S 43
TORSK	E	1	Ja	1	7,00	47,00 FF
TORSK	E	1	Ja	1	9,00	49,00 HM 289
TORSK	E	2	Ja	2	34,00	45,00 FF
TORSK	E	2	Ja	5	121,00	54,00 S 43
TORSK	E	2	Ja	5	100,00	44,50 HM 289
TORSK	E	3	Ja	5	116,00	41,00 S 43
TORSK	E	3	Ja	5	115,00	39,75 S 43
TORSK	E	3	Ja	4	98,00	38,25 S 43
TORSK	E	4	Ja	5	100,00	25,75 S 43
TORSK	E	4	Ja	12	240,00	25,75 S 43
TORSK	E	4	Ja	1	25,00	25,00 HM 289
Total for TORSK				**47**	**976,00**	
TOTAL				**66**	**1.564,00**	

List of purchased fish and fishery products **Sales result**

http://www.hirfiskauk.dk/Prices

Figure 6.16 Purchase list printed out and sales results on the website, Hirtshals, Denmark

Figure 6.15 shows the website where landing statements, sales notices and their detailed data in PDF, Excel and CSV files can be downloaded at Ofuna, Japan. Today's sales results, and fisheries statistics also be downloaded. Within an hour after the end of the day's sale, landing statements and sales notices are issued, followed by the sales results uploaded.

Figure 6.16 shows the purchase list printed out and sales results at Hirtshals, Denmark. There is a printer in the auction hall, and when a buyer puts his chip on the sensor, a list of fish purchased up until now is printed out.

5.6 Service charges

To ensure safety and quality of fish and safety and efficiency of operations for sale, clean seawater, tap water, ice and electricity are consumed, and machine and equipment such as electric forklifts, carts, and grading machine are used. Users shall be properly charged, in accordance with the rules. The more electronically the information on users' charges are recorded in real time, and invoices and bills are issued soon, the more efficient operations are carried out and the more labor and time are saved.

Figure 6.17 shows the management system for forklift use and its electricity charges at Ofuna, Japan. Each time a user charges a forklift, information on its use is automatically

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recorded on a server in the central computer room. Users other than market personnel are charged according to their use of the forklift and the electricity.

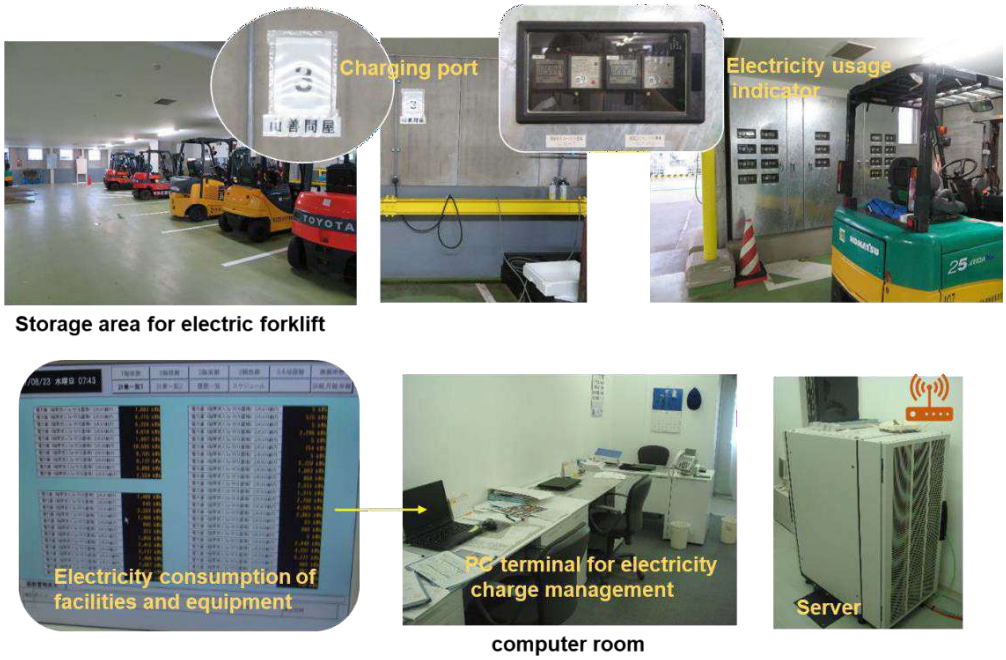


Fig. 6.17 Management system for forklift use and its electricity charges, Ofuna, Japan

5.7 **HACCP system facilitated by ICT**

At the auction hall where fish and fishery products are sold, the HACCP system is applied for food safety. Specifically, the auction hall is required to maintain and improve its structures & facilities, and machinery & equipment as well as provide guidance to users and maintain records of the measures taken to control hazards. As a part of the HACCP system, the person responsible draws up a management manual, which will be followed by the relevant personnel who will check the status of management at the control points and record the results in a record book (on paper generally). The person responsible finally confirms the results of the checks made by the personnel and keeps the record book.

Considering the limited number of personnel and their time, it is necessary to have a computerized system that can automatically manage the hygiene of people and vehicles entering and leaving the auction hall and fishing harbour, and easily record the results of hygiene management and provide them quickly upon request. The utilization of ICT in the control of the entry and exit of people and vehicles, and in recording the check results at the control points, can save personnel and time for the HACCP management.

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5.7.1 Automatic entry and exit management system

The automatic entry and exit management system for vehicles automatically authenticates the vehicle at the gate to ensure that it is a pre-registered vehicle, and also works in conjunction with the car wash facilities and gate operation to automatically control the hygiene and safety of vehicles entering the landing and clearance area. The vehicle can be identified either by contact, using an ID card, or non- contact, using an automatic reading of the vehicle number. The system eliminates the need of assigning the personnel to control whether vehicles are entering the auction hall properly, and ensures that the auction-related people (market personnel, buyers, distributors and transporters, etc.) comply with hygiene management for vehicle entry.

Figure 6.18 shows the example at Ishinomaki, Japan. Vehicle entry and exit facilities using contactless transit cards have been installed at the gate of the access road to the quay, allowing only authorised vehicles to enter. When a vehicle enters or exits the quay, the number on the vehicle's number plate is read at the gate, and if the vehicle is not registered, it is either not allowed to enter or is checked by the market personnel using a live camera, and if there is no problem, it is registered before being allowed to enter. There is also a car wash area at the entrance gate after passing through the gate, where water is sprayed in conjunction with the gate to wash tyres. At this time, video footage of the tyre washing process is recorded.



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Figure 6.18 Automatic entry and exit management system for vehicles, Ishinomaki, Japan

The automatic entry and exit management system for people confirms that the person has been registered in advance and automatically carries out hygiene and safety control in the workplace by opening the entrance door to the workplace in conjunction with hand washing, hand disinfection, changing into boots and boot washing. There are two methods of automatic authentication: contact method using ID cards and non-contact method using automatic reading of ID cards.

Figure 6.19 shows the example at Ishinomaki, Japan. All those entering the auction hall are required to wash their hands, disinfect their hands and wash their boots in the access control room, and only those who are authorized by ID authentication are allowed to enter. The washing of hands and boots is recorded on video.



Figure 6.19 Automatic entry and exit management system for people, Ishinomaki, Japan

5.7.2 **Camera system**

By placing cameras at various locations in the fishing harbour, including inside and outside the auction hall, the use of the fishing harbour such as the arrival, landing, anchoring and preparation for departure of fishing boats, the sales situation in the market, as well as the hygiene management status can be centrally monitored, recorded in real time from a PC terminal in the office.

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Figure 6.20 shows the centralized surveillance camera system at Akkeshi, Japan. Twenty-three cameras are installed in the fishing harbour, and PC terminals in the administration office allows the harbour and market personnel to view video footage in real time, as well as video footage automatically recorded on a server for the past two weeks. These images are used to check the entry of suspicious persons and non-authorized vehicles.

Figure 6.21 shows CCTV installed along the auction lean, Tarragona, Spain. Although there are differences in system structure and function between CCTV and surveillance cameras, both are installed and centrally controlled to monitor harbours and check the safety of operations in markets and other areas.



Figure 6.20 Surveillance cameras installed throughout the fishing port, Akkeshi, Japan

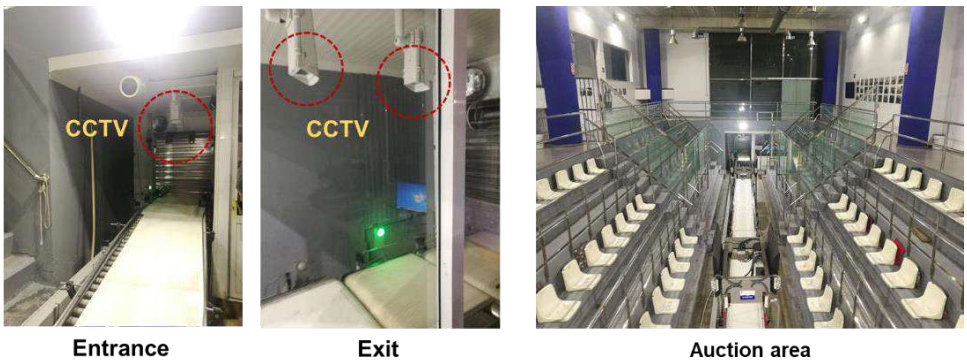


Figure 6.21 CCTV instolled along the auction lean, Tarragona, Spain

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Figure 6.21 shows CCTV installed along the auction lean, Tarragona, Spain. Although there are differences in system structure and function between CCTV and surveillance cameras, both are installed and centrally controlled to monitor harbour and check the safety of operations in markets and other areas.

5.7.3 Electronic recording for HACCP management

In accordance with the HACCP system, the relevant personnel check the hygiene management status at the control points and enters the results on the spot from the tablet terminal and records them on the server. The recorded information can be retrieved from the server by the person responsible for the hygiene management, hygiene controller, at any time, from anywhere, using a tablet or PC terminal, for final verification and storage.

5.8 Electronic information for traceability

Figure 6.22 shows a sales plate with traceability information, Spain. In response to growing consumer interest, retailers are selling fish with plates containing not only the price but also information on where and how the fish was caught, under the initiative of the Catalan Consumer Agency.

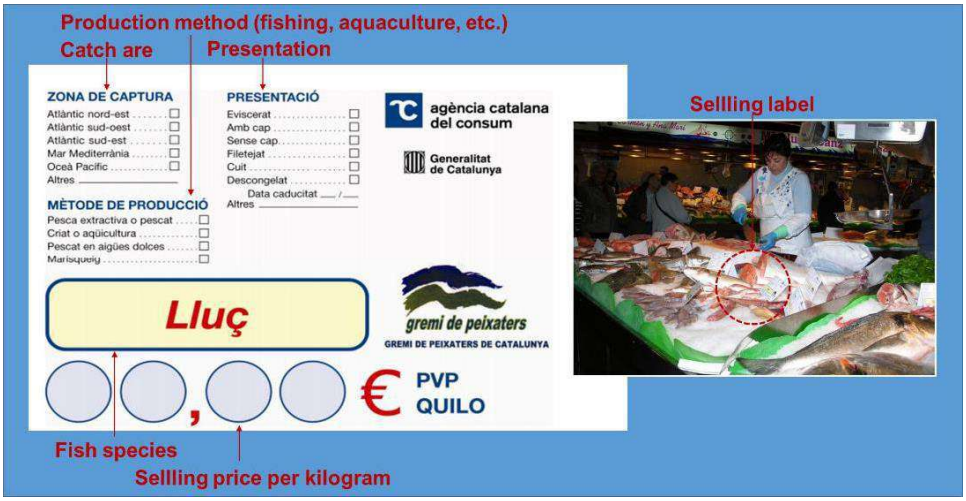


Figure 6.22 Sales plate with traceability information, Spain

The EU is described here as an example of how the necessary information is created, recorded and transmitted electronically in order to ensure traceability.

Lot-based traceability is the basic principle, and traceability information is transmitted on labels or vouchers by stating the lot ID, name and ID of the fishing vessel, species,

catch date, weight or quantity, and catch area, etc. as shown in Figure 6.22. This also applies to aquaculture products. In the case of lot consolidation or lot split, the original lot ID corresponding to the new lot should be recorded.

Traceability information on the fishery products is recorded and stored electronically to the market's database through the sales process. The labels, landing statements, sales notices and other documents are completed and issued electronically. Since the auction hall is the starting point for traceability, the ICT and IoT - based sales process at the first sale of the fishing harbour contributes greatly to the establishment of precise and efficient traceability information towards the end consumers.

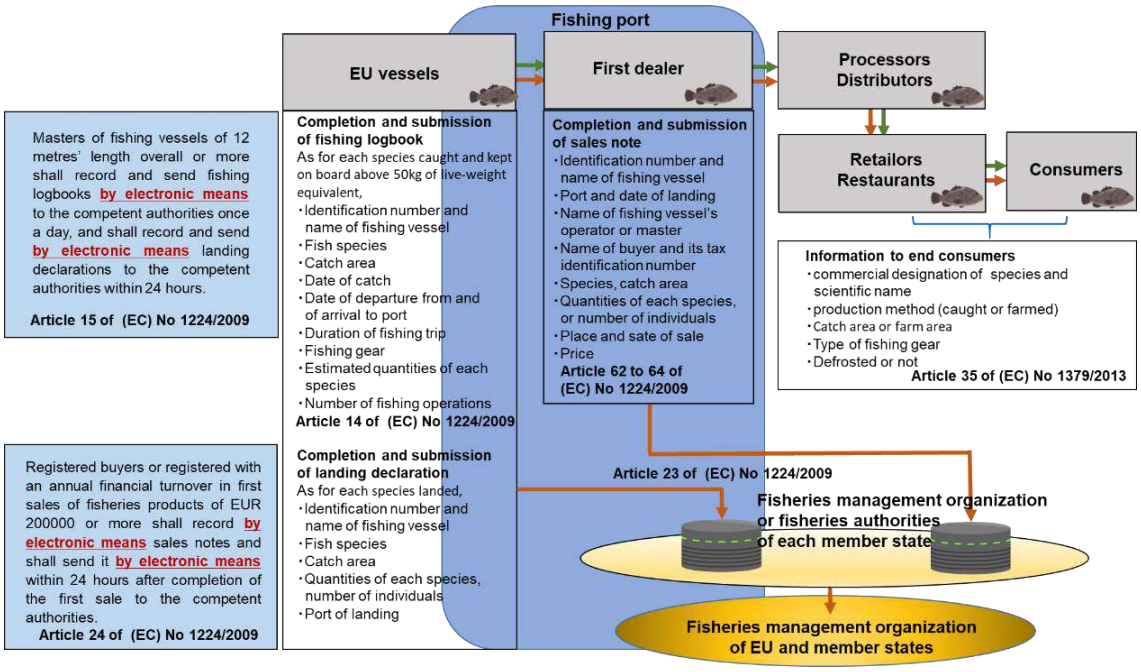


Figure 6.22 Recording, transmitting and displaying information on fish (fishery products)

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6. PROJECT COMPONENTS

6.1 Construction of Breakwaters

6.1.1 The Ajanur fisheries village is spread over five wards of Ajanur Gram Panchayat and the construction of this breakwater will be a great relief for the fishermen families in Ajanur as protection against high wave actions, adverse flow conditions near the entrance channel and wave breaking at low tides while manoeuvring their trawlers /boats.

6.1.2 This estimate is prepared for the construction of Breakwater at Ajanur, Chithari Kadappuram. The major components are Northern Breakwater of 1150 m length, Southern breakwater of length (425 m).

6.1.3 5 kg to 20 kg category stones of approved quality is proposed for the filter layer. Core of the breakwater is proposed to be constructed using 20 to 50 kg and 20-100kg category stones. Stones of 50-100kg,100-200kg, 200-300kg,500kg-1T category are proposed for secondary armour,2 to 3T and 500kg-1T category stones for berm or scour protection and2T, 6T tetrapods at sea side at trunk portion and 8T tetrapods at round head is proposed. At the leeward side 500 kg-1 T and 1T-2T category stones are proposed category stones for the primary armour layer. Crest width of 6.0 m at trunk and9.0 m at head is provided.

6.1.4 Total cost for this component comes to **Rs. 121,60,00,000** including 18 % GST.

6.2 Construction of River training work and dredging near the river training area

6.2.1 A river training work of Chithari River in the form of a beak water of length 432 m is proposed. River training work is proposed considering two major coastal processes: control of shitting and closing of Chittari River mouth due to sedimentation and southward littoral drift and littoral zone consideration.

6.2.2 5 kg to 20 kg category stones of approved quality is proposed for the filter layer. Core of the breakwater is proposed to be constructed using 20 to 50 kg and 20-100kg category stones. Stones of 50-100 kg,100-200 kg, 200-300 kg,500 kg-1 T category are proposed for secondary armour, 2 to 3 T and 500 kg-1 T category stones for berm or scour protection and 2T, 6T tetrapods at sea side at trunk portion and 8T tetrapods at round head is proposed. At the leeward side 500 kg-1T and 1T-2T category stones are proposed category stones for the primary

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armour layer. Crest width of 6.0 m at trunk and 9.0 m at head is provided.

6.2.3 Dredging is proposed in between the north break water and river training work at the mouth of River Chithari on an average 100 m width and 350 m length. It is proposed to dredge the area to a level of -3.0m.

6.2.4 Total cost for this component comes to **Rs. 32,60,00,000** including 18 % GST.

6.3 Dredging and Construction of Reclamation Bund

6.3.1 Dredging is proposed in the basin channel having average width 130 m and length 510 m It is proposed to dredge the area to a level of -3.0m.

6.3.2 The reclamation bund is proposed to be constructed along the basin for a length of 400 m. The bund shall have geotextile (120 grams per sqm membrane) in two layers including joints by stitching for bund along the basin dry rubble masonry with good quality blasted rubble for protection wall along the basin and with specified grade of reinforced cement concrete 1:1.5:3 is proposed for protection wall. Beneath the geotextile layer a layer of 6 mm stones, 20 mm stones and a core of 10 to 20 kg stones are provided respectively. The reclamation bund along the basin has a base width of 400 cm and top width of 115.9 cm, and has a height of 550cm. Provision for 180 RCC guard pillars is given.

6.3.3 Total cost for this component comes to **Rs. 6,24,00,000 including** 18 % GST.

6.4 Construction of Wharf and Auction hall

6.4.1 A 120 m long wharf with a width of 6.60 m for 60 m length and 5.00 m width for remaining 60 m length is provided for landing, berthing, and repair of fishing vessels. The beams and deck slab of wharf is proposed to be constructed of M-30 design mix using HCR reinforcement andM-35 bored cast-in-situ concrete piles of 750 mm diameter and 27.35m length is proposed as foundation for wharf. Facia wall of 1.5m depth is also provided. Wearing coat on deck slab is proposed using cement concrete 1:1.5:3 using 15mm broken stone for wharf.

6.4.2 Auction hall is of size 60 x 15 m is proposed on the rear side of the quay wall along landing area. The auction hall shall have RCC pile foundation with cast in situ concrete piles of M-35 grade, beams and slabs at floor level is made of M-30 design mix and with TMT bar of grade Fe-500D or more. 1.2 m long. Provision for column of size 40x 40 cm along with sloped roof of thickness 17.5 cm

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supported on longitudinal and cross beams of grad M 25 are provided. Provision for centering and shuttering, all cement plastering of mix 1:3, first quality ceramic glazed wall tiles for auction hall columns, industrial floor tiles, all painting works of required shade etc. also included in this proposal.

6.4.3 Total cost for this component comes to **Rs. 5,91,00,000** incl. 18 % GST.

6.5 Construction of Canteen, Rest shed, Locker room and Gear shed

6.5.1 Atwo-storied building of overall size 45 m x 10 m is proposed to accommodate net mending shed, shops and locker room in ground floor and canteen and rest rooms in the first floor. Net mending shed of size 23.2 m x 10 m is proposed in the ground floor. 5 locker rooms and 5 shop rooms of size 3.10m x 3.50 m size is proposed in the ground floor. A canteen of size 23.2 m x 10 m is proposed in the first floor along with 10 rest rooms of size 3.10m x 3.40 m. Head room of height 300cm is proposed.

6.5.2 The building shall have concrete isolated column footing over coconut piling work and rubble packing. PCC bed of nominal mix 1:4:8 is to be provided for walls, beams, floors etc. RCC belt is provided for long and cross walls. Random rubble masonry with hard stone is proposed upto plinth level and superstructure shall be of solid block masonry using pre cast solid blocks. RCC of nominal mix 1:1.5:3 for footing and plinth beam. RCC of nominal mix 1:1.5:3 for columns. RCC of nominal mix 1:1.5:3 for beams, roofs, lintel, and sunshade works, in ground and first floor. Fe 500-D and above grades steel is used in RCC works upto plinth level and upto floor five level. Rolling shutters of approved make is proposed for all rooms of first floor and stair room. Teak wood work is proposed for frames of doors and windows. Vitrified floor tiles in different sizes is proposed for flooring works in shop room, locker room, veranda, canteen, rooms and textured industrial 12mm thick floor tiles of first quality is proposed for flooring works in net mending shed. Provisions for centering and shuttering, plastering works, all painting works is also included in this proposal.

6.5.3 Total cost for this component comes to **Rs. 2,49,00,000** incl. 18 % GST.

6.6 Construction of Compound Wall and Side Protection Works

6.6.1 The compound wall is proposed to be constructed of laterite masonry with neatly dressed laterite stone of size 30x20x20cm. RR masonry of hard stone is proposed

for foundation. The side protection works shall have foundation with coconut piling work with 30 cm thick and 80 cm wide dry rubble masonry above it. Superstructure shall be of gabion structure with mechanically woven double twisted hexagonal shaped wire mesh gabion boxes along with geo-textile filter between pitching and embankment slopes, to prevent escape of the embankment material through the voids of the stone pitching.

6.6.2 Nominal mix CC-1:3:6 is proposed up to plinth level and CC-1:2:4 above plinth level for compound wall and as belt over protection work along with guard pillar. TMT bars of grade 500-D and above provided as steel reinforcement for works up to plinth level. Provision for excavation, 12 mm cement plastering, water thinnable cement primer and finishing walls with water proofing cement paint of required shade are also included in this proposal.

6.6.3 Total cost for this component comes to **Rs. 6,14,00,000** including 18 % GST.

6.7 Gate and Gate House

6.7.1 To provide security to the harbour area and to facilitate toll collection it is proposed to construct a gatehouse. The gate house is proposed to accommodate toll booth and ATM counter of size 2.4 x2.4 m each. The gate is supported by two main pillars (0.9x0.3m) and the top portion is decorated by providing pergola which is made up of four long beams and five cross beams. Also the pergolas are covered by UV stabilised fibre glass reinforced plastic sheet for protection against harsh sun rays. The main gate of length 7m and two wicket gates of 0.9mon either side in steel are also proposed. Both the toll booth and ATM counter is provided with sloped roof. The column footing is proposed for main pillars.

6.7.2 PCC concrete of nominal mix 1:4:8 is proposed for works upto plinth level, dry stone packing with good quality blasted rubble is provided under foundation for pillars, walls and steps. RR masonry with hard stones is used in foundation and plinth. Solid block masonry using pre cast solid blocks of size 30x20x20 cm are to be used for gate house walls up to floor two level with 1:6 CM. RCC M30 mix is proposed for all components above plinth level and for column footing of gate house. TMT bars of grade Fe 500D or more used as steel reinforcement for R.C.C works for columns, lintel, roof slab and pergolas

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6.7.3 Total cost for this component comes to **Rs. 1,80,00,00** including 18 % GST

6.8 Construction of Internal Road, Parking Area and Drainage facility

6.8.1 A 4 m two-way internal road system is proposed to accommodate various type of vehicle entering and leaving the fishery harbour. The internal road is proposed to be made of MSS type A Bitumen S-65.Well graded GSB and WMM layer of 15 cm thickness is proposed over well compacted original surface. Prime coat, tack coat and Mix Seal Surfacing of total thickness 20 mm, 4 m wide and 370 m long of required quality is applied on main road. 30cm wide concrete kerb of nominal mix 1:3:6 is provided for the main road. Laterite boulder masonry with hard departmental stone is proposed for construction of boundary wall of main road. Granular Sub-base with Well Graded Material of 23 m x 42 m for parking area and 4 m wide for main road with 15 cm thickness for both is provided. TMT bars are provided as steel reinforcement in foundation.

6.8.2 Total area of4320 sqm is proposed for parking. The proposed parking area is to be constructed with PCC and RCCM25 of thickness 10 cm and 15 cm respectively with side drains for drainage. A nominal mix CC of mix 1:3:6 for parking area, drainage bed and side walls, and median kerb of the main road is to be provided. The drain is proposed to be made with concrete PCC bed, side walls, cover slab sand 5 cm thick levelling course. Guard stone of 15 cm height is proposed on the side of drainage and parking areaat 2m centre to centre.

6.8.3 Total cost for this component comes to **Rs. 2,82,00,000** including 18 % GST.

6.9 Toilet Block

6.9.1 Toilet block includes 4 w/c, counter room cum cloak room, courtyard, bath area and wash area. RR masonry is proposed in foundation with 0.15m thick PCC bed. Cement concrete flooring is to be provided. PCC bed of nominal mix is proposed for walls, beams, floors etc. RCC belt for long and cross walls is proposed.M30 grade RCC is proposed for lintels, beams, sunshade, staircase and roof. The building shall have concrete foundation, Random rubble masonry with hard stone upto plinth level and superstructure shall be of laterite masonry. Brick masonry manhole with RCC top and foundation is proposed. RCC roof slab of M30 mix is proposed.

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6.9.2 Total cost for this component comes to **Rs. 25,00,000** including 18 % GST

6.10 Approach Road

6.10.1 The proposed road work involves 950m length with 5.5m in width. There exists a partially damaged road having average width of 4m. The road starts from Kanhangad Kadappuram road junction and ends at proposed Fishing Harbour. This is the only one approach road to the fishing harbour, hence this road is also proposed as BM and BC road. For the entire stretches, black topping is proposed after filling base course of 15 cm thick WMM. The sub base is prepared by compacting the original ground supporting the embankment. Black topping work includes prime coat, tack coat, 5 cm thick BM and 3cm thick BC. Provisions for loosening and compacting, clearing grass, shifting of utilities and land acquisition are included in the estimate.

6.10.2 Total cost for this component comes to **Rs. 1,38,00,000** including 18 % GST

6.11 Work shop building

6.11.1 This9.8m x 9.8m building which includes contains office room, shop, an electrical workshop, a mechanical workshop, a crane facility and a workspace is proposed. 0.15m thick and 2m wide PCC bed of 1:4:8 mix is proposed for wall and column foundations. Random rubble masonry with hard stone shall be used in wall foundation and plinth. DR packing under foundation with good quality blasted rubble is provided. TMT bars of grade Fe-500D or above is proposed for RCC works upto Plinth level. Plinth beam of 0.45m thickness is proposed. Superstructure shall be constructed of laterite masonry with neatly dressed laterite stone of size 40x20x15cm. RCC belt for long and cross walls, RCC for column and its footing and M30 RCC for lintel, roof slab, sunshade, stair, ground and first floor beams is proposed to be constructed.

6.11.2 Total amount of estimate comes to **Rs. 46,80,000** including 18 % GST.

6.12 Construction of office room cum harbour surveillance camera room

6.12.1 A two storey building is proposed for office and harbour surveillance camera room having a plinth area of 299.2 m2. Ground floor contains office room, store room, rest room, 3 toilet, porch, entrance, stair room, and an open area for cabins. First floor contains an additional store room. It also includes provisions for a septic tank and soak pit. PCC bed of nominal mix is proposed for wall and

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column foundations. Random rubble masonry with hard stone shall be used in wall foundation. Superstructure shall be constructed of laterite masonry with neatly dressed laterite stone of size 40x20x15cm. RCC belt for long and cross walls, RCC for column and its footing and RCC for lintel, roof slab, sunshade, stair, ground and first floor beams is proposed to be constructed with concrete of specified grades. Plastering shall be 12 mm cement plaster of mix:1:4 and 1:3 for ceiling and shall be finished with approved paints. Doors, windows and ventilators shall be made of Aluminium. Glass panes shall be provided at the entrance, stair room and for office room for more provision of natural light.

6.12.2 Total amount of estimate comes to Rs. **89,00,000** including 18 % GST

6.13 Water supply arrangements in the harbour

6.13.1 Construction of a new O.H. RCC water tank and Sump for the Ajanur fishing harbour is planned for water supply having a capacity of 100000 litres. It has 60 cm diameter bored cast in situ pile foundation using RCC M 35 mix, lying below a 15 mm thick PCC layer of 1:4:8, a 75 cm thick M 30 RCC layer and 60 cm pedestal below GL successively. RCC columns of size 40X40 cm are provided and RCC water tank using M 30 mix at top in a frame supported by columns, beams and haunches. The beams are in three levels and are also proposed under the tank slab. An RCC cover slab is also proposed. Laterite masonry with neatly dressed laterite stones of size40x20x15 cm size is proposed for superstructure above plinth level upto floor 2 level. Steel ladders are proposed to provide access to the top for cleaning and maintenance functions. Plastering and suitable painting are also proposed. Provisions for distribution lines are also included. Masonry chamber as manhole is proposed. The construction of Pump House at bottom of the RCC tank is planned.

6.13.2 An RCC sump of 50000 litres capacity near the existing water tank is planned. The foundation of the sump is proposed over a dry rubble packing of 45 cm thickness. 15cm thick PCC 1:4:8 is proposed above it. It has an RCC bed slab of M30 grade. The base slab, 20 cm thick side wall and 15 cm thick covering slab is proposed. Laying of pipe lines for pumping and distribution is planned. Two gates with GI tubes and painting its surface with epoxy painting is planned. Necessary pump set and electrification will be done.

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6.13.3 Total amount of estimate comes to Rs. **1,89,00,000** including 18 % GST

6.14 Construction of Wharf for Berthing facility

6.14.1 A Berthing wharf of length 100 m and width 5m is proposed to be constructed near the south breakwater. The wharf is supported on 75cm diameter piles spaced at 6m effective span on length wise direction and 3.8 m effective span on transverse direction. Length of the proposed pile assumed as 27.35 m including 3.5m steel lining works. The deck slab of 20cm thickness is supported on longitudinal beams and cross beams of size 40x 80 cm. RCC M35 grade concrete is used for piles and M30 is used for beams slabs etc.

6.14.1 Total amount of estimate comes to Rs. **2,14,00,000** including 18 % GST

6.15 Effluent Treatment Plant

6.15.1 Lump sum provision of **Rs. 35.00 Lakh** is included in this estimate for construction of ETP.

6.16 Navigational Aid

6.16.1 Lump sum provision of **Rs. 2.00 Lakh** is included in this estimate to set up navigational aids in the harbour.

6.17 Pressure Washer and Cleaning Equipments

6.17.1 Lump sum provision of **Rs. 6.00 Lakh** is included for pressure washers, cleaning equipment, pump sets etc. All these were executed in various fishing harbours and the expenditure toward the same is included here.

6.18 Landscaping, Green Belt and Rainwater Harvesting

6.18.1 Lump sum provision of **Rs. 20.00 Lakh** is included in this estimate to set up facilities for landscaping, rainwater harvesting and green belt.

6.19 Mechanical conveyor system & Automation

6.19.1 Lump sum provision of **Rs. 150.00 Lakh** is included in this estimate to set up facilities for mechanical conveyor system & automation.

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6.19.2 Electrification and Installation of Solar energy system

6.19.3 Lump sum provision of **Rs. 250.00 Lakh** is included in this estimate to set up facilities for electrification and Installation of Solar energy system

6.20 Cost Estimate

6.20.1 The cost estimate for the project has been worked out with the help of PRICE software. Rate analysis for such projects is included for HED in the software. The quantities of various items of work for breakwaters are calculated from the areas of cross sections of the structure plotted in AutoCAD. CPWD schedule of rates with current cost index for Kasargod District is adopted for the cost estimate.

6.20.2 The general abstract of cost estimate of the project is shown below. The detailed cost estimate is appended to this report

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Table 6.1General Abstract of Cost

Sl No	Item	Quantity	Unit Rate in Rs	Amount in Rs
1	Construction of Breakwater at Ajanoor	1575m	772063.5	121,60,00,000
2	Construction of river training wall and and dredging near the river training area	Training wall-435m Dredging- 31000 m3		32,60,00,000
3	Dredging And Construction of reclamation Bund	Dredging - 132500 m3 Reclamation bund- 400 m		6,24,00,000
4	Wharf and Auction Hall	Wharf - 120 m x 6.6 m , Auction Hall - 60 m x 15 m Total 1692m3	34929.1	5,91,00,000
5	Canteen, Rest shed, Locker room, Gear Shed	45 m x 10 m (two Storey)	27666.7	2,49,00,000
6	Compound wall and Side Protection Works	Compound wall- 510 m Side protection- 1710 m		6,14,00,000
7	Gate and Gate House	2.4 m x 2.4 m ATM and Toll Booth each (area 47.16m2)	38167.9	18,00,000
7	Internal Road, Parking area and Drainage facility	Parking Area - 4320 sqm	3873.6	2,82,00,000
		Internal Road - 740*4 m		
8	Toilet Block	13.3*5	37594.0	25,00,000
9	Construction of approach road to fishing harbour	950 m	14526.3	1,38,00,000
10	Construction of workshop building	9.8*9.8 m	48521.4	46,80,000
11	Construction of office room cum harbour surveillance camera room	14.6*22.6 m (2 storey)	26851.7	89,00,000
12	Construction of wharf for berthing facility	100*5 m	42800.0	2,14,00,000
15	OH Tank and Water Supply Arrangement	As per estimate		1,89,00,000
14	Effluent Treatment Plant	LS		35,00,000
17	Navigational Facility	LS		2,00,000
18	Pressure Washer and Cleaning equipments	LS		6,00,000
19	Landscaping, Green Belt and Rainwater Harvesting	LS		20,00,000

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24	Mechanical conveyor system & Automation	LS	1,50,00,000
23	Electrification and Installation of Solar energy system	LS	2,50,00,000
		Total (A) including GST	**189,62,80,000**
Smart Infrastructure and automated systems			
30	Smart Technology Investments		
30.1	Procurement and installation of smart infrastructure components, such as IoT devices, sensors, communication networks, and data management systems including cost of hardware, software, and installation services.	LS	1,00,00,000
30.2	Development or customization of software for data management, analysis and visualization	LS	50,00,000
31	Communication and Connectivity		
31.1	Deployment of communication infrastructure, including internet connectivity, satellite communication systems, and wireless networks	LS	50,00,000
31.2	Implementation of networking equipment and cyber security measures	LS	50,00,000
32	Safety and Security Measures		
32.1	Investment in safety equipment (distress beacons and rescue drones)	LS	50,00,000
32.2	Installation of surveillance system including CCTV camera	LS	50,00,000
35	Provide charging stations for electric vehicles	L.S	10,00,000
36	Vehicle for installing IOT devices	L.S	35,00,000
		Sub total	**3,95,00,000**
		GST @ 18%	**71,10,000**
		Sub Total (B) including GST @ 18%	**4,66,10,000**
		Sub Total (C= A+B)	**194,28,90,000**
		Contingencies @ 3%	**5,71,10,000**
		Grand Total	**200,00,00,000**
Rupees Two hundred crore only			

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6.21 Source of Fund

6.21.1 The project is proposed under PMMSY. As per guidelines, the funding will be shared between Centre and State in the ratio 60:40.The sunken costs of surveys, investigations and model studies have already been incurred by HED. Major part of the project management cost shall be met by the department and the work charged establishment proposed in the DPR is only for the additional technical man power required for implementing the project.

6.22 Procurement

6.22.1 The project shall be implemented by HED by the standard procurement procedure in force in the department. Upon obtaining administrative approval for the project, the proposal shall be studied in detail and subjected to technical sanction from the Chief Engineer who is delegated with the powers for projects of such value. Agency for execution of the work shall be selected by way of inviting e-tenders with Pre- Qualification system. The bids are subjected to scrutiny of prequalification committee to select qualified bids. The statutory tender committee selects the best offer to arrive at a contract.

6.23 Implementation Schedule

6.23.1 A detailed WBS and program of work shall be formulated on real time basis on scheduling software during the technical sanction procedure to finalize the baseline schedule. At present, it is estimated that a period of 18 months is required for the implementation of the work.

Implementation Schedule

Construction of Ajanur Fishing Harbour

Sl No	Stages of Implementation	Month																									
		1st	3rd	5th	7th	9th	11th	13th	15th	17th	19th	21st	23rd	25th	27th	29th	31st	33rd	35th	37th	39th	41st	43rd	45th	47th	48th
1	Technical Sanction and Tendering																									
2	Construction of Breakwater at Ajanoor																									
3	Construction of River training work and Dredging near the river training area																									
4	Dredging And Construction of reclamation Bund																									
5	Wharf and Auction Hall																									
6	Canteen ,Rest shed, Locker room,gear shed																									
7	Compound wall and side Protection works																									
8	Gate and Gate House																									
9	Construction of Wharf for Berthing Facility																									
10	Internal Road ,Parking area and Drainage facility																									
11	Sewage treatment Plant																									
12	Water Supply Arrangement																									
13	Electrification																									

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6.24 Manpower Requirement and Capacity Building

6.24.1 HED has the necessary resources to carry out surveys, designs, estimation, scheduling, procurement and project implementation management. Each of the project location has a sub-divisional office headed by Assistant Executive Engineer to implement the project. The Divisional office at Kasargod headed by Executive Engineer and the North Circle office at Kozhikkode headed by Superintending Engineer shall be in charge of procurement, monitoring and control of the projects. Surveys and investigations are carried out by the HED Investigation & QC sub division, Vellayil.

6.24.2 The department has its offices and trained project resources to supervise the implementation of the project. The North Circle office at Kozhikkode will be doing the procurement process subjected to the approval of the tender committee. The division office in Kasargod District with the help of the Sub division offices shall be supervising the project execution and billing. Quality control is done looked after by the field office and monitored by the quality control subdivision. HED also has the change management system in place wherein any changes in scope, time and cost shall be regulated.

6.24.3 Thus, the department already possesses the required resources and expertise to carry out the project. The overhead on project formulation and management is borne by HED.

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7. ECONOMIC EVALUATION

7.1 Cost-Benefit Analysis

7.1.1 Economic viability depends upon the sustainability of project effects. Projects are sustainable if their net benefits or positive effects endure as expected throughout the life of the project. Sustainability is enhanced if environmental effects are internalized, and if financial returns provide an adequate incentive for project related procedures and consumers. The concept of financial profit is not the same as economic profit. The financial analysis of a project estimates the profit accruing to the project-operating entity or to the project participants, whereas economic analysis measures the effect of the project on the national economy. For a project to be economically viable, it must be financially sustainable as well as economically efficient. If a project is not financially sustainable, economic benefits will not be realised. Financial analysis and economic analysis are therefore two sides of the same coin and are complementary.

7.1.2 Fishing harbours and related infrastructures created are primarily meant for poor fishermen communities in respective locations and any development in this sector can be considered to be a service oriented one rather than a commercial one. However, if an economic analysis is carried out for any fishery related infrastructure or the like, the cost benefit accrued will be highly promising.

7.1.3 On detailed analysis, the cost-benefit ratio of Ajanur fishing Harbour comes to 1.37. The detailed cost-benefit analysis is provided in the appendix. The intangible benefits such as increased safety of fishermen’s life and property and general improvement in the overall working of the harbour is beyond a cost-benefit analysis and thus cannot be included. Considering the resources potential of the area, investment proposal of the project is found to be economically viable. The total project cost comes to Rs 20,000 lakhs. The amount can be met from PMMSY scheme.

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7.2 Project Risk Analysis

7.2.1 Risk identification, probability and impact of risks and risk response strategy are worked out to reduce negative risks and to harness positive risks. The risks identified and response strategy are listed below

Sl. No.	Risk	Positive/ Negative	Probability	Impact	Mitigation measure
1	Delay in statutory clearances	-ve	10%	Delay in commencement	Fast tracking of execution
2	Ban on mining during elections	-ve	25%	Delay in commissioning	Accept
3	Lack of competition in tenders	-ve	25%	Tender excess	Contingency reserve included in the cost
4	Hazards in execution in marine environment	-ve	10%	Delays	Risk transferred to contractor
5	Flood/ Hurricane	-ve	10%	Losses to structure	Accept the risk
6	Pandemics like COVID-19	-ve	10%	Delays	Accept the risk

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8. CONCLUSION

8.1.1 The proposal for the development of a fishery harbour at Ajanur is presented in this report. The main component of the proposal is extension of two breakwaters and river training work to create permanent tranquil basin for the safe landing of vessels in all seasons. The other facilities included are construction of wharf, auction hall, internal roads, parking area, loading area, water supply, electrification, drainage and sanitation arrangements, dredging etc. This project is absolutely necessary for the social and financial improvement of fishermen folk living in and around the proposed site. The total estimated cost for this project comes to Rs. 20000 lakh. This harbour construction will contribute to the socio-economic uplift of the area especially the downtrodden fishermen community and also provide employment to thousands of people both directly and indirectly. Considering the resource potential of the area and investment proposed, the project is found to be economically viable. The State Government requests the Government of India to sanction financial assistance for implementation of construction of Fishing Harbours under PMMSY.

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WHARF LENGTH CALCULATION

Landing, Outfitting, Repair and Berthing lengths

After considering the current fleet size operating from this area, the design fleet size of this harbour is arrived - motorised non- mechanical vessels - 553 Nos of 15m (avg length), motorised mechanical vessels -50 nos of 10 m (avg length) and traditional boats (non-motorised) - 30 nos of 8 m (avg length)

Of this, landing quay facilities are to be created for the MFVs, non MFVs and traditional vessels. Additional wharf lengths may be provided for landing, berthing and outfitting facilities for the MFVs, non MFVs and traditional vessels. The number of boats, length, annual average landing, etc. is given below in the statement form.

Overal vessel length (m)	Number of vessels	Fishing trips (days)	Fishing trips per year	Average daily landing
8	30	1	220	60
10	50	1	150	800
15	553	1	44	1136

The following assumptions are made while calculating the length of landing quays.

• At any time, 10% of the totals fishing fleet are not fishing due to maintenance, repair or any other reason.

• The vessels that go on 5 days trip will be equally distributed on each with same number of departures/ arrivals.

• Duration of fish landing hours in the fishery harbour will be 6 hours.

• An unloading rate of 4500kg/hour is assumed considering that the fish will be unloaded in fish baskets/boxes manually.

• During the peak month of the fishing season, some boats are expected to arrive with additional fish catch. Though this larger catch is expected to arrive only on a few days during the peak season, it has been safely assumed that daily on an average, 40% of the 8m vessels arrive in the peak hour with 20% additional fish catch, 20% of the 10 m vessels will arrive with additional 15 % increase in the fish catch. and 30% of the 15 m vessels will arrive with additional 10% increase in the fish catch.

Landing length for 15 m vessels: No landing length required as carrier vessels bring the catch to land.

Landing Length for 10 m Vessels on wharf				
Number of Vessels considered		=	50	
Number of boats operating per day (90%)	0.90x50	=	45	
Number of boats arriving in an hour (20%)	0.20x45	=	9	
Average fish landing / boat		=	800	kg
Peak landing per boat (+20%)	1.20x800	=	960	kg
Time required for unloading @4500/hr	960 x 60 / 4500	=	13	minutes
Time required for docking and undocking	2+2	=	4	minutes

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Total time required	4+13	=	17	minutes
Number of berths required to handle 8 vessels in one hour	9x17/60	=	3	Nos
Landing quay length required	3(10+1)	=	28	metre

Landing Length for 8 m Vessels on wharf				
Number of Vessels considered		=	30	
Number of boats operating per day (90%)	0.90x30	=	27	
Number of boats arriving in an hour (40%)	0.40x27	=	11	
Average fish landing/ boat		=	60	kg
Peak landing per boat (+20%)	1.20x60	=	72	kg
Time required for unloading @4500/hr	60x72/4500	=	1	minutes
Time required for docking and undocking	2+2	=	4	minutes
Total time required	4+1	=	5	minutes
Number of berths required to handle 140 vessels in one hour	11x5/60	=	1	Nos
Landing quay length required	1(8+1)	=	8	metre

Outfitting Length for 8 m Vessels

Number of boats requiring outfitting in a peak season per day	0.90x30	=	27	
Time required for each boat to receive fuel water and ice		=	10	minutes
Duration of outfitting hours		=	8	hours
Number of berths required for Outfitting	27x10/8x60	=	1	
Length of Outfitting required	1(8+1)	=	5	metre

Outfitting Length for 10 m Vessels

Number of boats requiring outfitting in a peak season per day	0.90 x50	=	45	
Time required for each boat to receive fuel water and ice		=	10	minutes
Duration of outfitting hours		=	8	hours
Number of berths required for Outfitting	45x10/8x60	=	1	
Length of Outfitting required	1(10+1)	=	11	metre

Outfitting Length for 15 m Vessels

Number of boats requiring outfitting in a peak season per day	(0.90*553) / 5	=	100	
Time required for each boat to receive fuel water and ice		=	10	minutes
Duration of outfitting hours		=	8	hours
Number of berths required for Outfitting	(100x10)/(8x60)	=	2	
Length of Outfitting required	2(15+1)	=	33	metre

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Berthing Length

Berthing length is provided for idle berthing of 20% of vessels after unloading their catch and before proceeding on a fishing trip. The remaining vessels can anchor innside the river for idle berthing during fair season. The vessels are assume to berth four abreast while idel berthing)

Berthing Length for 8 m Vessels

Berthing is provided for 20 % of vessels	0.20x30	=	6	
Assuming vessels berth 4 abreast. Number of berth required		=	2	
Landing berth available		=	1	
Outfitting berth available		=	1	
Number of berth to be provided	2-(1+1)	=	0	
Berthing required for 8 m vessels	0x(8+1)	=	0	metre

Berthing Length for 10 m Vessels

Berthing is provided for 20 % of vessels	0.20x50	=	10	
Assuming vessels berth 4 abreast. Number of berth required		=	3	
Landing berth available		=	3	
Outfitting berth available		=	1	
Number of berth to be provided	3-(3+1)	=	0	
Berthing required for 10 m vessels	0x(10+1)	=	0	metre

Berthing Length for 15 m Vessels

Berthing is provided for 20 % of vessels	0.20x553	=	111	
Assuming vessels berth 4 abreast. Number of berth required		=	28	
Landing berth available		=	0	metre
Outfitting berth available		=	2	metre
Number of berth to be provided	28-(0+2)	=	26	
Berthing required for 6 m vessels	26x(15+1)	=	409	metre

Repair length

Provide repair quay of 1 boat length

8 m vessel	8+1	=	9	metre
10 m vessel	10+1	=	11	metre
15 m vessel	15+1	=	16	metre

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Summary of waterfront length required					
Overall length of Vessels (m)	Landing length (m)	Outfitting length (m)	Berthing length (m)	Repair length (m)	Total length (m)
As per calculation					
8	8	5	0	9	22
10	28	11	0	11	50
15	0	33	409	16	458
Total					**530**

Annexure 17.2 of Harbour& Coastal Engineering (Indian Scenario): Vol.II of C.T.BETGERI, Deputy Director Central Institute of Coastal Engineering for Fisheries, Bangalore India.

530 m wharf is required in the harbour. In the first phase a wharf length of 220m is proposed

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COST BENEFIT ANALYSIS

Construction of Ajanur Fishing Harbour						
Cost Benefit Analysis						
The fish landings and toll revenue should be accounted for the original investment of constructing the harbour. But special investment is required to make the harbour operational throughout the year and this will gain 30 additional fishing days for the harbour. The amount for this comes to 30x500000 = 150 Lakhs per year. As the original cost is also taken for cost benefit analysis, a total of 300 fishing days is taken for the benefit calculations						
PROJECT COST						
Year	**Expansion of Ajanur Fishing Harbour**	**Quantity**	**Unit**	**Rate /Unit in Lakh Rs**	**Cost in Lakh Rs.**	**PV**
0	First Year amount				8000.00	8000
1	Balance works year 2				8000.00	7273
2	Balance works year 3				4000.00	3306
3						
4						
5	Replenishment / Maintenance of harbour @ 2.0% of construction cost / 5 yrs				400.00	248
6						
7						
8						
9						
10	Replenishment / Maintenance of harbour @ 2.0% of construction cost / 5 yrs				400.00	154
11						
12						
13						
14						
15	Replenishment / Maintenance of harbour @ 2.0% of construction cost / 5 yrs				400.00	96
	Total				**21200.00**	**19076.86**

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PROJECT BENEFITS						
Year	**Expansion of Muthalapozhy Fishing Harbour**	**Quantity**	**Unit**	**Rate /Unit Lakh Rs**	**Cost in Lakh Rs.**	**PV**
1	Nil					
2	Nil					
3	Fuel savings, 633 boats, (5Lx300daysxRs.120/L)	633	Nos	1.8	1139.40	856
3	Savings on Road transportation of fishermen and gears, 633 boats, van charges Rs1500/day x 300days	633	Nos	4.5	2848.50	2140
3	Time value saving on catch	633	Nos	0.5	316.50	238
3	Additional Fish Landings	30	Days	5	150.00	113
3	Toll/user charges	30	Days	0.333	9.99	8
4	Savings on fuel, transportation, time, fish landings and toll added together for 4th year				4464.39	3049
5	=Do=				4464.39	2772
6	=Do=				4464.39	2520
7	=Do=				4464.39	2291
8	=Do=				4464.39	2083
9	=Do=				4464.39	1893
10	=Do=				4464.39	1721
11	=Do=				4464.39	1565
12	=Do=				4464.39	1422
13	=Do=				4464.39	1293
14	=Do=				4464.39	1176
15	=Do=				4464.39	1069
	Total				**58037.07**	**26208**
					NPV=	7132
					B/C=	**1.37**

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BORE HOLE DETAILS

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BORE LOG

PROJECT : General investigation work for the proposed Ajanur Fishery Harbour
LOCATION : Kanhangad Harbour
CLIENT : Executive Engineer, Harbour Engineering Division, Kasargod

BORE HOLE NO :6
TYPE OF BORING : Rotary Drilling
DATE OF START : 28/12/2022
DATE OF FINISH : 29/12/2022

WATER TABLE LEVEL (From GL): 1.70 m
RL :
TERMINATION DEPTH : 25.75 m

SAMPLES
SPT : 14
DS : 13

Depth (m)	Soil Profile	Description of the soil	Thickness of Layers (m)	Standard penetration test data: Depth (m)	15	30	45	N	Graphical representation of 'N' value	Remarks
0		Ordinary Sand Soil	0.4	0.00					0 15 30 45 60	
0.4		Sand	10	1.50	5	8	13	21		
				3.00	13	14	14	28		
				4.50	15	28	22	>50		Balance- 2 cm
				6.00	18	31	19	>50		Balance- 4 cm
				7.50	25	>50	-	>50		Balance- 17 cm
				9.00	10	13	18	31		
10.4		Clay	7.5	10.50	1	1	1	2		
				12.00	1	1	2	3		
				13.50	1	1	1	2		
				15.00	1	2	1	3		
17.9		Stiff Clay	5.7	18.00	12	14	18	32		
				21.00	12	19	27	46		
23.6		Silty Weathered	2.15	24.00	18	31	19	>50		Balance- 5 cm
25.75				SPT Rebounded at 25.75m						No Sample

Bore Hole terminated at 25.75 m

Asst.Engineer

Asst. Exe. Engineer

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MODEL STUDY REPORT

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भारत सरकार / Government of India
जल शक्ति मंत्रालय / Ministry of Jal Shakti
जल संसाधन, नदी विकास और गंगा संरक्षण विभाग
Department of Water Resources, River Development and Ganga Rejuvenation
केन्द्रीय जल और विद्युत अनुसंधान शाला
खडकवासला, पुणे – 411 024
CENTRAL WATER & POWER RESEARCH STATION
Khadakwasla, Pune – 411024

MATHEMATICAL MODELLING FOR COASTAL ENGINEERING DIVISION (Coastal and Offshore Engineering Laboratory)

TECHNICAL REPORT No.: 6283
July 2024

मछली पकड़ने के बंदरगाह के निर्माण के कारण जल-गत्यात्मकता और गाद का आकलन करने के लिए गणितीय प्रतिमान अध्ययन अजनूर, केरल

MATHEMATICAL MODEL STUDIES TO ASSESS HYDRODYNAMICS AND SILTATION DUE TO CONSTRUCTION OF FISHING HARBOUR AT AJANUR, KERALA

Dr. R. S. Kankara
Director

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REPORT DOCUMENTATION SHEET

Technical Report No. 6283 **Date: July 2024**

Title: MATHEMATICAL MODEL STUDIES TO ASSESS HYDRODYNAMICS AND SILTATION DUE TO CONSTRUCTION OF FISHING HARBOUR AT AJANUR, KERALA

Officers Responsible for Conducting the Studies

The studies were conducted by Boora Krishna, Scientist 'B', Dr. Naren Scientist 'B' and Naval Jagatap, Scientist 'B' under the supervision of Dr. Jiweshwar Sinha, Scientist 'E' and Dr. Prabhat Chandra, Additional Director and overall supervision of Dr. R. S. Kankara, Director, CWPRS, Pune.

Name and Address of Organization Conducting the Studies

Mathematical Modelling for Coastal Engineering Division
Central Water and Power Research Station, Pune - 411 024

Name and Address of Authority Sponsoring the Studies

Chief Engineer,
Harbour Engineering Department (HED),
Kamaleshwaram, Manacaud - P.O, Thiruvanathapuram – 695 009

Synopsis

Mathematical model studies to assess hydrodynamics and sedimentation aspects for the proposed development of fishing harbour at Ajanur was referred to CWPRS by Chief Engineer, HED, Kerala. The model simulations for hydrodynamics and sedimentation were carried out for the existing and the proposed condition.

As per the wave and littoral drift simulation results the proposed layout having 1150m long north breakwater, 425m long south breakwater, 435m breakwater as a river training work was studied for hydrodynamics and siltation point of view. Further, dredging upto -2m in the approach channel of the Chittari river mouth with appropriate dredging along the river was incorporated in the model. Also, dredging upto -4m in the harbour basin was considered in the hydrodynamic model simulations. The model results revealed that the annual sedimentation i.e. depth of deposition for the proposed condition in the harbour basin would be about 0.03m per year whereas depth of deposition at the river mouth would be about 0.045m in a year. A reduction in current speed due to the proposed development in the channel i.e. dredging of the channel up to -2m as well as in the proposed harbour basin would cause the loss of depth in the site. Further, an annual sedimentation of about 0.05m along the north and south of the breakwaters is also observed from the model results. Based on the model results, the proposed layout of the training works and the harbour basin is found to be suitable with the prevailing conditions at the site.

Key Words: Mathematical Model, Breakwater, Current, Sedimentation, MIKE 21

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MATHEMATICAL MODEL STUDIES TO ASSESS HYDRODYNAMICS AND SILTATION DUE TO CONSTRUCTION OF FISHING HARBOUR AT AJANUR, KERALA

Technical Report No.:6283	**DATE: July 2024**

1.0 INTRODUCTION

Harbour Engineering Department (HED), Government of Kerala proposed to develop a fishing harbour at Ajanur situated about 15km south of Kasaragod district. Ajanur fishing harbour is located geographically at Latitude 12.33^0 N and Longitude 75.18^0 E in Kerala state on the western coast of India. Fig. 1 shows the location map of Ajanur fishing harbour.

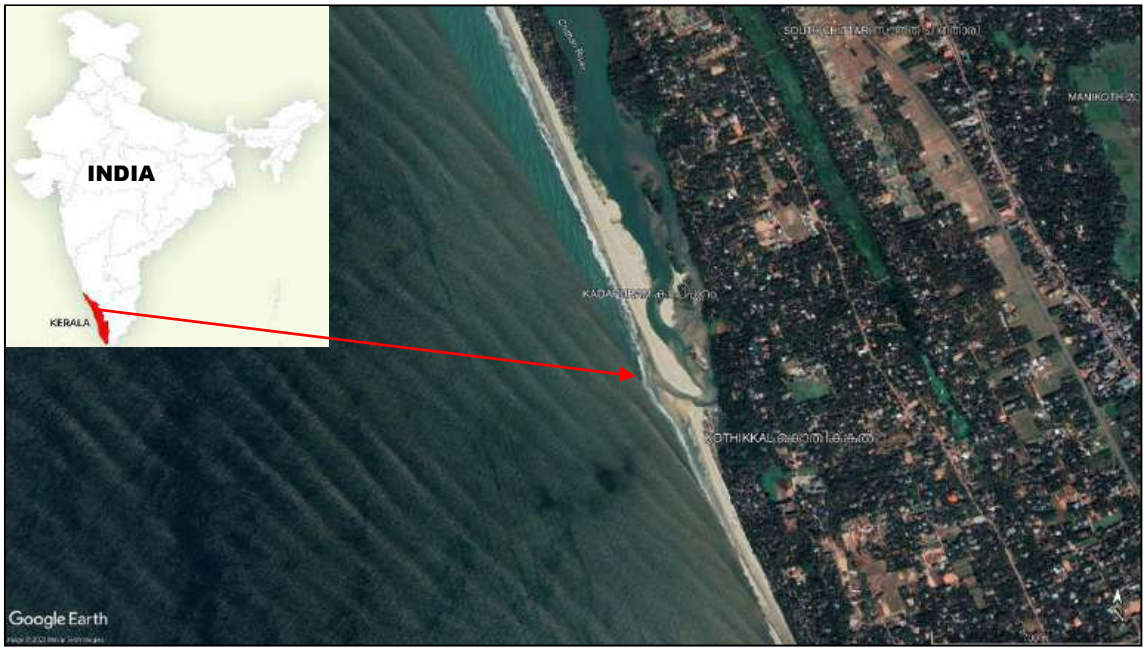


Figure 1: Location of Site at Ajanur

CWPRS carried out wave model studies on the same study area in the year 2016. These studies proposed one final layout of fishing harbour. As per the CWPRS 2016 report vide T. R. No. 5436, Nov 2016, the harbour basin area is about 19 hectares. Considering the future expansion as suggested by the Technical Sanction Committee of Pradhan Mantri Matsya Sampada Yojana (PMMSY) scheme vide HED Letter No. D4/9509/06/CE dated 16-06-2022, HED proposed a revised layout of the Ajanur fishing harbour. The revised layout consists of 1150m long north breakwater, 425m long south breakwater and 435m breakwater as a river training work near the mouth of Chittari river. River training work is proposed in the present layout considering two major coastal processes: - (i) control of shifting and closing of Chittari River mouth due to sedimentation (ii) Southward littoral drift and littoral zone consideration (from CWPRS study T. R. No 5357 Feb 2016). The revised layout is shown in Fig. 2.

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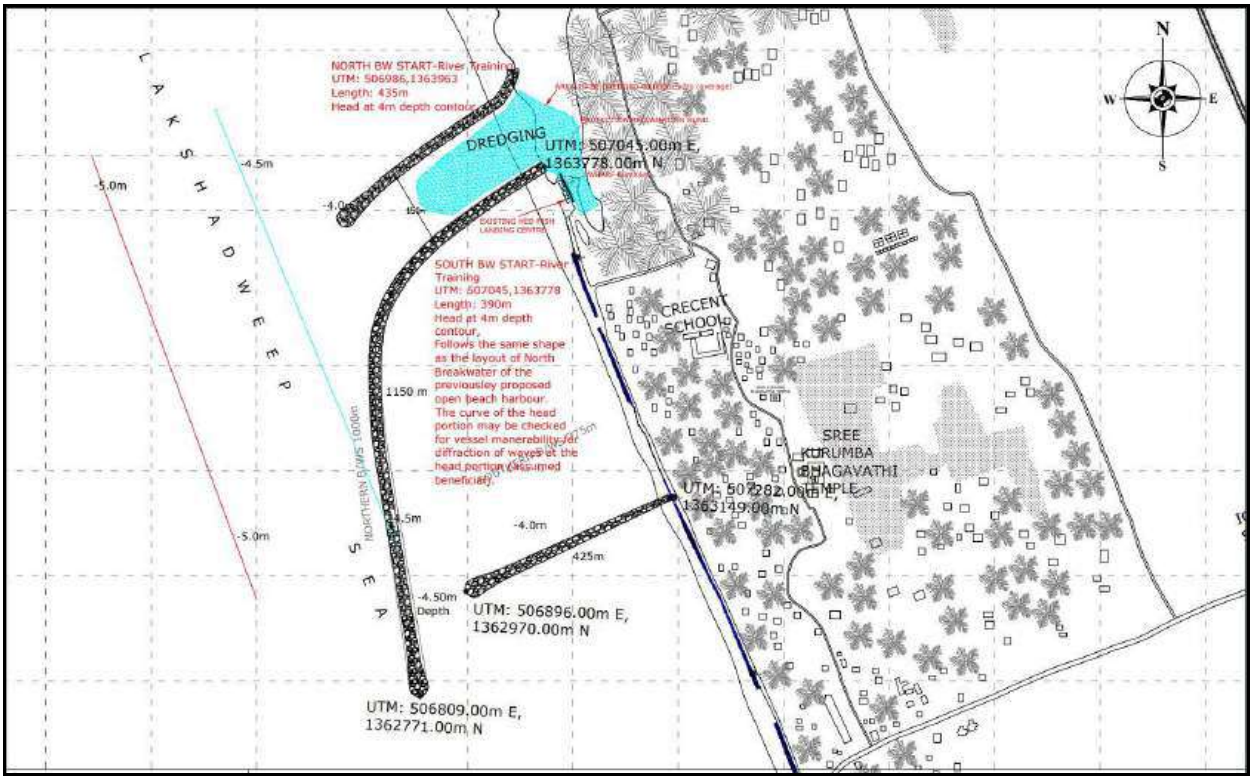


Figure 2: Proposed Layout at Ajanur

2.0 SCOPE OF STUDIES

Mathematical model studies to assess the hydrodynamics and siltation due to the proposed construction of fishing harbour are undertaken.

Following are the objectives of the present studies:

(i) To study the hydrodynamics and siltation with the existing condition.

(ii) To study the changes in hydrodynamics and siltation with the proposed condition wherein fishing harbour layout and river training work are included.

3.0 DATA ANALYSIS

The data required for the model studies are bathymetry of the area, tidal data, grain size distribution, suspended sediment concentration, river discharge, if any etc. HED, Kerala, the Project Authority (PA) has conducted field survey to collect the aforementioned data during March 2023. Earlier, PA conducted survey to collect the data in the year 2022 (1st June to 7th June). After examining the data, it was found that the data was not appropriate for numerical modelling. Hence, a re-survey for collecting the data were conducted by PA between 15th March to 20th March 2023. The data is collected both in river region (Lat:12.347, Lon 75.062) and in offshore region (Lat: 12.334 Lon: 75.0611). Henceforth, in this report these two points are called as P1 and P2 respectively as per Fig. 3. The details of the data collected are discussed below.

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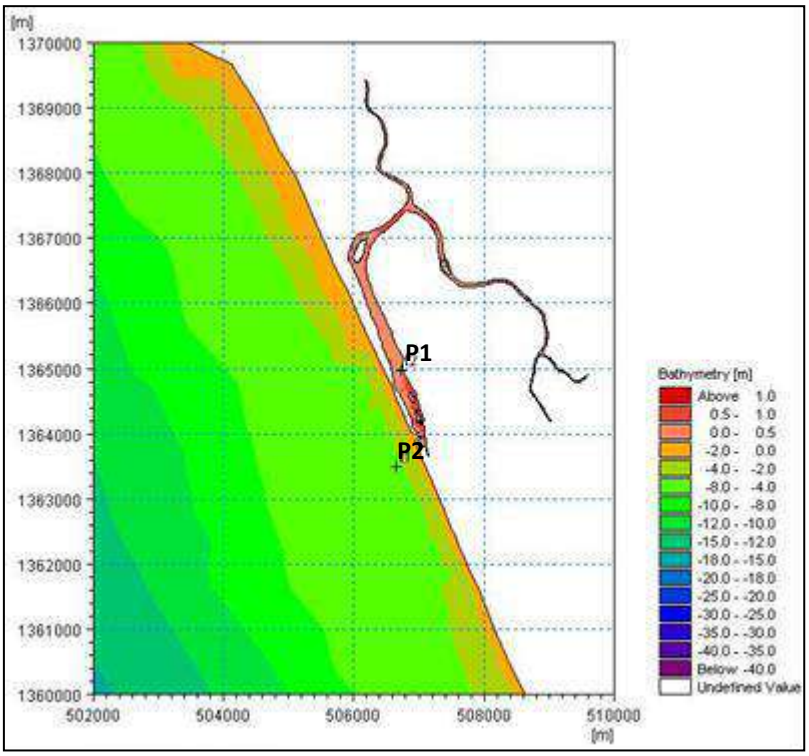


Figure 3: Field data collection points

3.1 Bathymetry

The bathymetric data for offshore shore region is obtained from C-MAP data. The nearshore bathymetry data is obtained from the hydrographic charts supplied by PA. The Acoustic Doppler Current Profiler (ADCP) of CWPRS is used to obtain the data of water level depth over the estuary and river region. The water level depth measurements are further used to estimate the bathymetry. The estimated bathymetry used in this study is shown in Fig 4.

3.2 Tides

Tidal data is collected from 15th March 2023 to 20th March 2023 at two different locations i.e., river (P1: Lat:12.347, Lon 75.062) and over sea region (P2: Lat: 12.334 Lon: 75.0611) as mentioned above. The tide data obtained at P1 and P2 w.r.t Mean Sea Level (MSL) is shown in Fig. 5. The MSL at Ajanur is 0.98m. It is observed that the spring tide tidal range (Global Tide) is about 1.30m. It is observed from the plot that tidal data at P1 is almost continuous with few missing values. However, the data at P2 is discontinuous not following usual tidal trends.

3.3 Tidal Currents

Field observed current data collected at locations P1 and P2 during March 2023 is shown in Fig 6. It is observed that the current data at both P1 and P2 shows numerous spikes at different time steps. Tide and currents data find importance in the study for calibrating the model.

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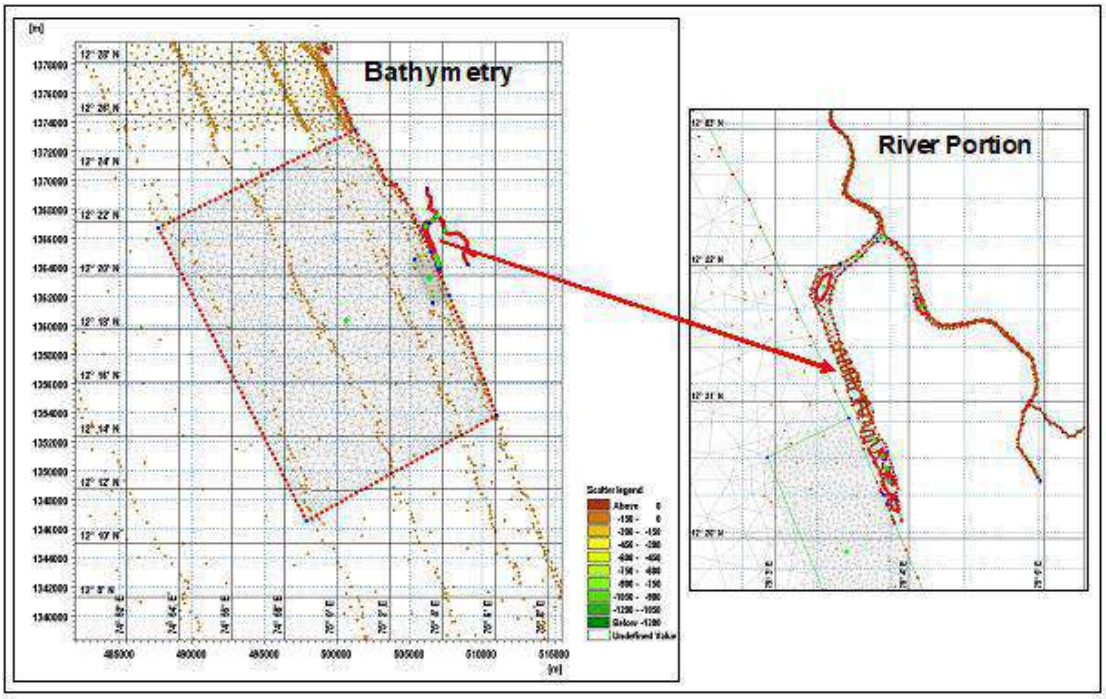


Figure 4: Bathymetry data

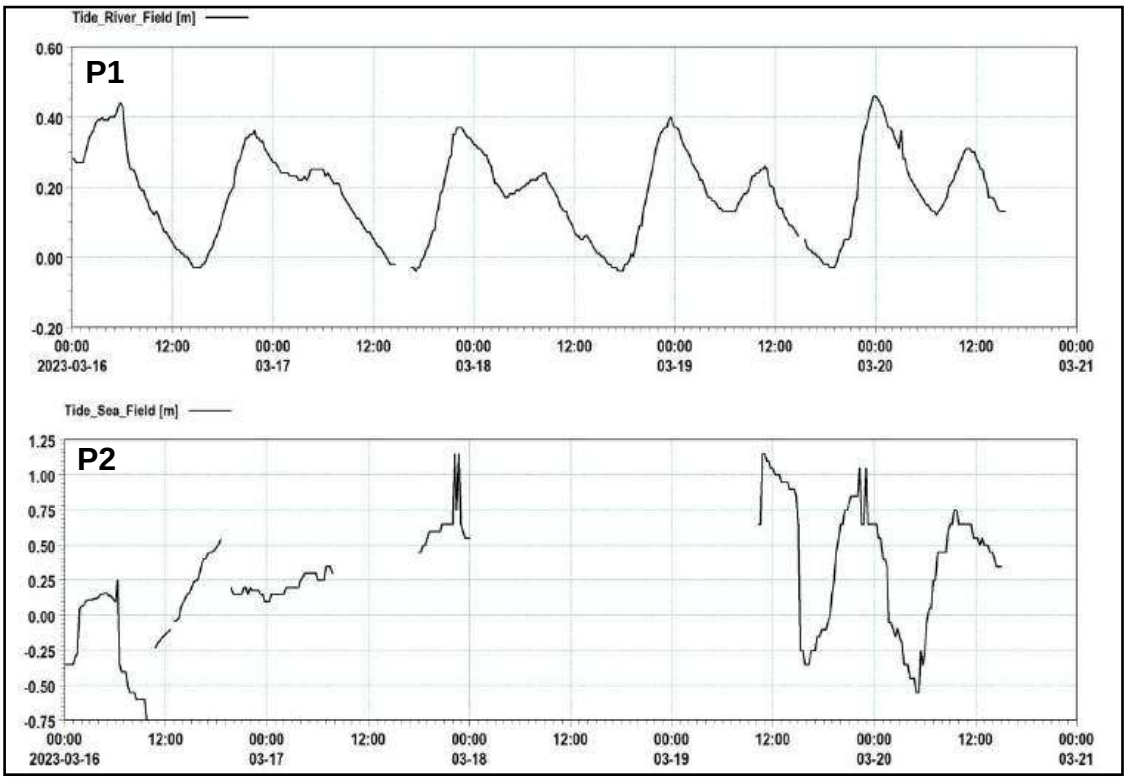


Figure 5: Observed tides at P1 and P2

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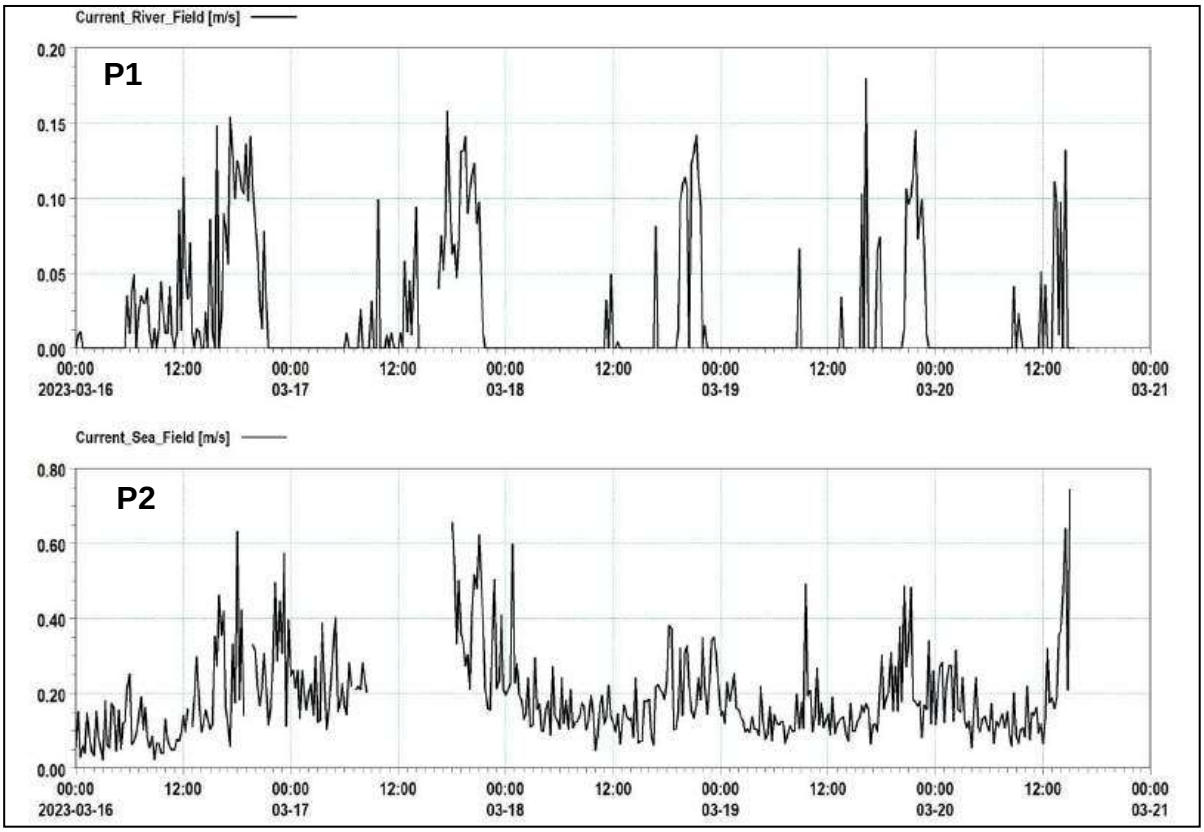


Figure 6: Observed current at P1 and P2

3.4 Sediment Data

The sediment data is collected and supplied by HED which comprised of the bed sample taken in the year 2022. The average D_{50} is 0.064mm in sea and D_{50} in river is 0.210mm.The grain size distribution at P1 and P2 is shown in Fig. 7. Water samples are collected at river and sea point (P1 and P2) during March 2023 to estimate the Suspended Sediment Concentration (SSC). From the data it is observed that SSC varies at P1 from 0.1mg/l to 0.15mg/l. Whereas, variation of SSC is between 0.05mg/l to 0.11mg/l at P2. The average suspended sediment concentration (SSC) in is 0.210mg/l and 0.08mg/l at P1 and P2 respectively. These average values of SSC are used for modelling.

3.5 Discharge Data

The river discharge is also a required parameter for calibrating the model. The river Chittari is a non-perennial river having variation in discharge during monsoon and non-monsoon seasons. As per HED, the river carries minimal discharge during monsoon and almost no discharge during the non-monsoon season. During the time period of field data collection, discharge in the river is only due to influence of tidal fluxes. The river discharge of 6 m^3/s is obtained through river ADCP observations is considered for non-monsoon season and for monsoon season, 25 m^3/s discharge is considered for modelling.

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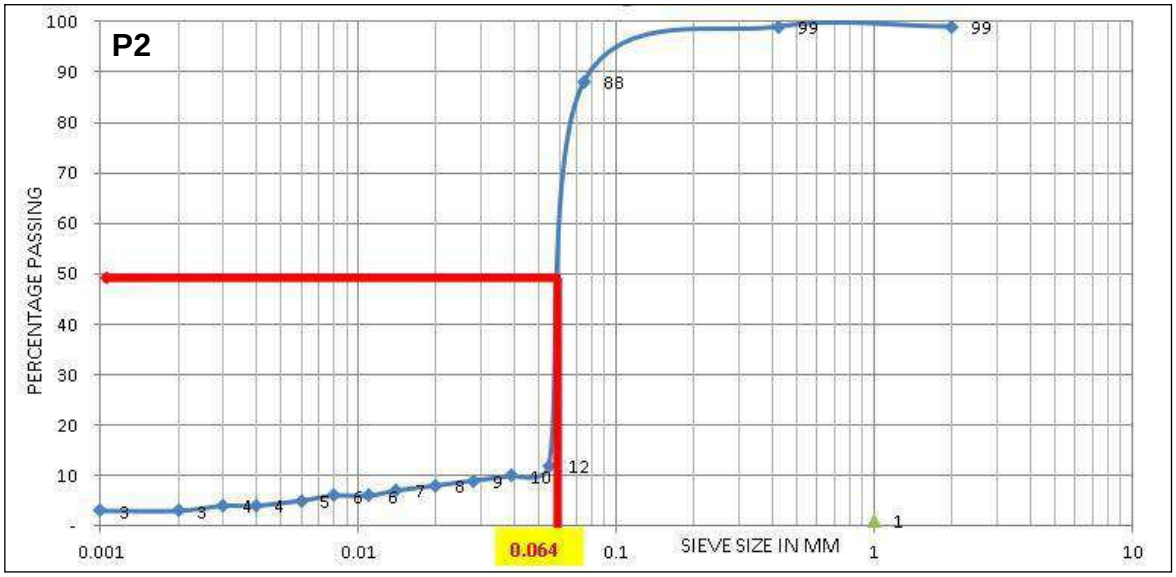


Figure 7: Grain size distribution at P1 and P2

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203647/2025/T HED

Table 1: Details of suspended sediments concentration at P1 and P2

P1				P2			
Sample no.	Date	Time	Suspended solids in mg/l	Sample no.	Date	Time	Suspended solids in mg/l
W1	15/03/2023	7.00pm	0.12	W1	15/03/2023	10.30am	0.07
W1	16/03/2023	8.00 am	0.13	W2	15/03/2023	7.45pm	0.06
W2	16/03/2023	2.00pm	0.1	W1	16/03/2023	3.00pm	0.07
W3	16/03/2023	8.00pm	0.11	W1	17/03/2023	8.00am	0.07
W1	17/03/2023	8.00am	0.14	W2	17/03/2023	8.15pm	0.07
W2	17/03/2023	2.00pm	0.15	W3	17/03/2023	2.00pm	0.11
W3	17/03/2023	8.00pm	0.11	W4	17/03/2023	2.30pm	0.11
W1	18/03/2023	8.00am	0.13	W5	17/03/2023	8.00pm	0.09
W2	18/03/2023	2.00pm	0.11	W1	18/03/2023	8.00am	0.06
W3	18/03/2023	7.00pm	0.13	W2	18/03/2023	1.30pm	0.08
W1	19/03/2023	8.00am	0.1	W3	18/03/2023	9.00pm	0.05
W2	19/03/2023	2.00pm	0.12	W1	19/03/2023	8.00am	0.08
W3	19/03/2023	8.00pm	0.1	W2	19/03/2023	3.00pm	0.1
W1	20/03/2023	7.00am	0.11	W1	20/03/2023	8.30am	0.09
W2	20/03/2023	2.00pm	0.1	W2	20/03/2023	1.00pm	0.07

4.0 METHODOLOGY

The mathematical model studies are carried out using MIKE 21 software using the Flexible Mesh. The flexible mesh is considered as suitable for creeks with meandering coastline. The hydrodynamic studies include simulation of the flow field for the following conditions: -

1. Calibration of the model with the existing site conditions of the year 2023.
2. In the proposed condition, the layout as shown in Fig. 2 is studied for assessment of changes in the hydrodynamics and sedimentation.

The model run to evaluate hydrodynamics would be calibrated with the observed field data along with wave induced currents (radiation stresses) from wave model studies. The calibrated model will be used to predict the changes in the flow pattern for the proposed condition. The results of the above hydrodynamic studies are used as basic input for the sediment transport studies.

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Model studies are carried out by coupling the flow models with sedimentation models to predict the evolving changes in sedimentation pattern. The results of these studies show the spatially varying pattern of siltation and erosion. The simulation of hydrodynamics and sedimentation (for existing and proposed condition) is separately performed for monsoon and non-monsoon seasons. The comprehensive detail of the hydrodynamics, wave and siltation studies for both existing and proposed condition is useful information for the coastal population and also the policy makers.

5.0 DESCRIPTION OF MODULES OF MIKE 21 FM

The 2-dimensional hydrodynamic model MIKE 21 HD, Flexible Mesh is used for simulating the flow field in the model domain and MIKE 21 MT for the sediment transport studies in the existing and the proposed scenario under prevailing tidal and wave conditions. The brief description of scientific background of MIKE 21 HD and MIKE 21 MT is given below.

5.1 MIKE-21 HD MODULE:

For any major developments in coastal areas, it is necessary to know dynamics of the water body in terms of velocity and water level fluctuations beforehand. The appropriate governing equations for studying water movement in coastal areas are the two-dimensional shallow water equations. These shallow water equations are obtained by vertically integrating the 3-Dimensional incompressible Reynold's averaged Navier- Stokes equations of motion over depth $h = \eta + d$ with the following simplified assumptions.

- The flow is incompressible,
- The flow is well mixed (no variation in density)
- Vertical accelerations are negligible,
- Bed stress can be modeled.

$$\frac{\partial h}{\partial t} + \frac{\partial h\bar{u}}{\partial x} + \frac{\partial h\bar{v}}{\partial y} = hS \qquad (1)$$

$$\frac{\partial h\bar{u}}{\partial t} + \frac{\partial h\bar{u}^2}{\partial x} + \frac{\partial h\overline{vu}}{\partial y} = f\bar{v}h - gh\frac{\partial \eta}{\partial x} - \frac{h}{\rho_0}\frac{\partial p_a}{\partial x} - \frac{gh^2}{2\rho_0}\frac{\partial \rho}{\partial x} + \frac{\tau_{sx}}{\rho_0} - \frac{\tau_{bx}}{\rho_0} -$$

$$\frac{1}{\rho_0}\left(\frac{\partial s_{xx}}{\partial x} + \frac{\partial s_{xy}}{\partial y}\right) + \frac{\partial}{\partial x}(hT_{xx}) + \frac{\partial}{\partial y}(hT_{xy}) + hu_sS \qquad (2)$$

$$\frac{\partial h\bar{v}}{\partial t} + \frac{\partial h\bar{v}^2}{\partial x} + \frac{\partial h\overline{uv}}{\partial y} = f\bar{u}h - gh\frac{\partial \eta}{\partial y} - \frac{h}{\rho_0}\frac{\partial p_a}{\partial y} - \frac{gh^2}{2\rho_0}\frac{\partial \rho}{\partial y} + \frac{\tau_{xy}}{\rho_0} - \frac{\tau_{by}}{\rho_0} -$$
$$\frac{1}{\rho_0}\left(\frac{\partial s_{yx}}{\partial x} + \frac{\partial s_{yy}}{\partial y}\right) + \frac{\partial}{\partial x}(hT_{xy}) + \frac{\partial}{\partial y}(hT_{yy}) + hv_sS \qquad (3)$$

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The over bar indicates a depth average value for example, $\bar{u}$ and $\bar{v}$ are the depth-averaged velocities defined by

$$h\bar{u} = \int_{-d}^{n} u dz\,, \qquad h\bar{v} = \int_{-d}^{n} v dz$$

The lateral stresses T_{ij} include viscous friction, turbulent friction and differential advection. They are estimated using an eddy viscosity formulation based on the depth average velocity gradients.

$$T_{xx} = 2A\frac{\partial \bar{u}}{\partial x} \qquad T_{xy} = A\left(\frac{\partial \bar{u}}{\partial y} + \frac{\partial \bar{v}}{\partial x}\right) \qquad T_{yy} = 2A\frac{\partial \bar{v}}{\partial y}$$

The following symbols are used in the equations:

t	:	Time
x and y	:	Cartesian co-ordinates
$h = \eta + d$	:	Total water depth
d	:	Still water depth
S_{xx}, S_{xy}, S_{yy}	:	Components of radiation stresses
$\tau_{xx}, \tau_{xy}, \tau_{yy}$	:	Shear stress components
ρ	:	Density of water
$\bar{u}\bar{v}$	:	Depth averaged velocities
η	:	Surface Elevation
g	:	acceleration due to gravity (m/s^2)
f	:	wind friction factor related to Coriolis parameter
p_a	:	Atmospheric pressure
ρ_0	:	Density of water
S	:	Magnitude of discharge due to point sources
u_s, v_s	:	velocities at point sources
$f = 2\Omega sin\Phi$	:	Coriolis parameter (Ω is the angular rate of revolution and φ the geographic Latitude)
A	:	Horizontal eddy viscosity

The governing equations are solved by using an element-centered finite volume method. The spatial domain is discretised into non-overlapping elements, which can be either triangular or quadrilateral. The time integration can be done by using first order explicit Euler method (referred to as the lower temporal order scheme) or by using second order Runge Kutta method (referred to as the higher temporal order scheme).

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5.2 MIKE-21 MT MODULE

The sediment transport studies were carried out using MIKE 21 MT model. This model simultaneously solves hydrodynamic and sediment transport equations. The calibration of sediment transport model is difficult because morphological changes are too slow and temporal bed changes are too variable to measure anything significant for comparison. The sediment fluxes at various locations may differ and the following factors contribute for these variations:

- Unsteadiness of flow,
- Mixtures of sediment in suspension,
- Variability of supply of mobile sediment on the bed,
- Presence of sandy (non-cohesive) sediment,
- Omission of depth variation,
- Effect of wave stirring.

The erosion, transport and deposition of silt, mud and clay particles under action of currents and waves can be best described by the multi-layers mode of the mud transport module of MIKE 21. The sediment transport module is dynamically coupled with the 2-dimensional hydrodynamic module, MIKE 21 HD. The module solves the primitive equations in two dimensions using finite difference methods by Alternating Direction Implicit technique and the Double Sweep algorithm. Following are the relationships used in the module.

The sediment transport formulations are built into the advection-dispersion module, MIKE 21 AD, which solves advection-dispersion equation:

$$\frac{\partial c}{\partial t}+u\frac{\partial c}{\partial x}+v\frac{\partial c}{\partial y}=\frac{1}{h}\frac{\partial}{\partial x}\left(hD_x\frac{\partial c}{\partial x}\right)+\frac{1}{h}\frac{\partial}{\partial y}\left(hD_y\frac{\partial c}{\partial y}\right)+Q_L C_L\frac{1}{h}-S \qquad (4)$$

The following symbols are used in the equation:

c	:	compound concentration (arbitrary units)
u,v	:	horizontal velocity components in x, y directions (m/s)
h	:	water depth (m)
Dx,Dy	:	dispersion coefficients in the x,y directions (m2/s)
S	:	accretion/erosion term (kg/m3/s)
QL	:	source discharge per unit horizontal area (m2/s/m2)
CL	:	concentration of source discharge (kg/m3)

The advection-dispersion equation is solved using an explicit, third-order finite difference scheme, and known as the ULTIMATE scheme.

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6.0 MODEL STUDIES

The MIKE 21 HD module is used to study the hydrodynamics. For studying the sedimentation, MIKE 21 MT module is used. These modules are used for the existing and proposed layouts. The details of MIKE 21 HD and MIKE 21 MT modules used in this study are discussed below.

6.1 Computational Model

The spatial extent of computational model considered for model simulations is 16km (cross-shore) X 22km (along the shore). The computation model with its offshore and onshore boundaries is shown in Fig. 8. The Chittari river discharging into the ocean is considered to a certain extent in the computation model as shown in Fig. 8.

All oceanographic features of the study region in existing condition are incorporated in the computational model. The complete study area was discretised into computational unstructured mesh. The spatial resolution of the mesh is finer along the area of development (harbour area). Finer mesh resolution is adopted near harbour area in order to capture the variation in near shore tide and currents more accurately. The mesh resolution is coarser along the offshore boundary. The developed mesh showing the fine and coarser resolution in the computational model is shown in Fig. 9.

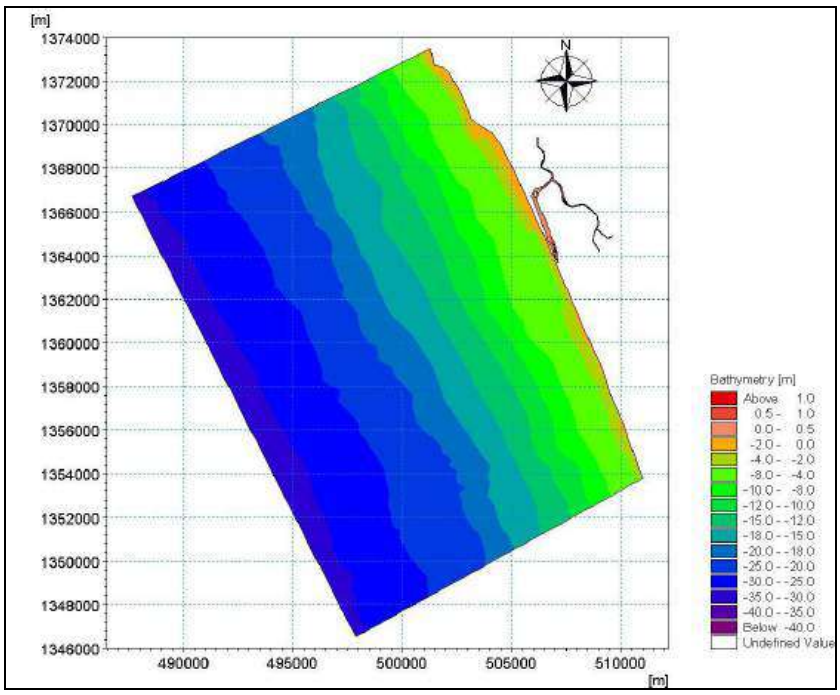


Figure 8: Computational model

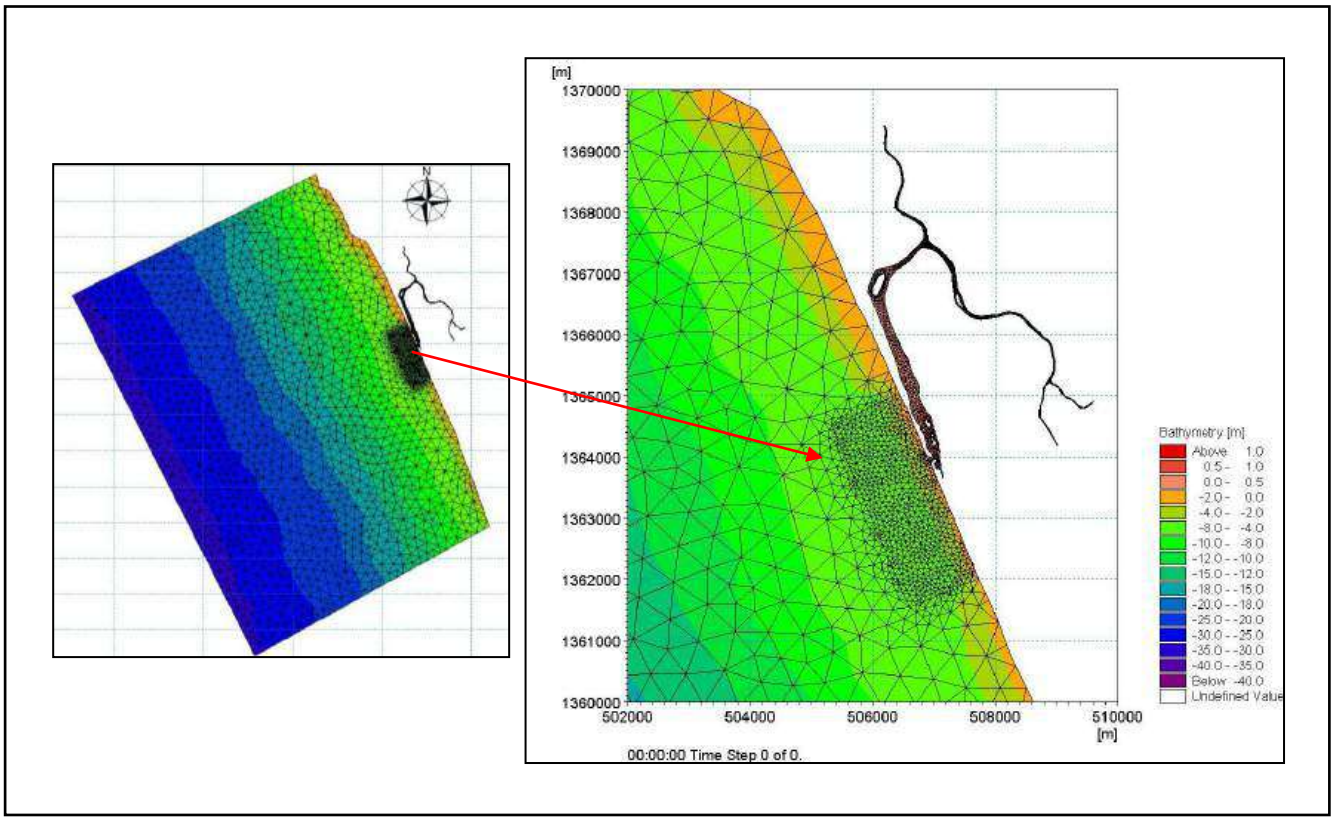


Figure 9: Computational mesh showing variable mesh resolution

6.2 Simulation of Flow Field – Existing condition- non-monsoon and monsoon seasons

Initially, flow field are modelled for the existing conditions for both non-monsoon and monsoon seasons. Defining boundary condition is essential for modelling the flow field. There are three offshore boundaries and one land boundary. The boundary tides are defined along these three offshore boundaries. The boundary tides obtained from MIKE 21 Global tidal model is used to define the boundary condition with phase lag. Further, discharge along the Chittari river is also given as another boundary condition. As the flow is assumed to be parallel to the contours along the western boundary, no-cross flux was considered in the west boundary in the open sea. Radiation stresses are also considered in the simulation to take into account the effect of wave induced currents. With these given forcings, MIKE 21 HD module is used to model the variation in tides and currents for a period of 15 days in non-monsoon (March 2023) and monsoon (July 2023) separately. The changes in flow fields are estimated every 30 minutes. Typical velocity vector plots during different phase of tides obtained during non-monsoon and monsoon seasons are shown from Fig. 10 to Fig. 13.

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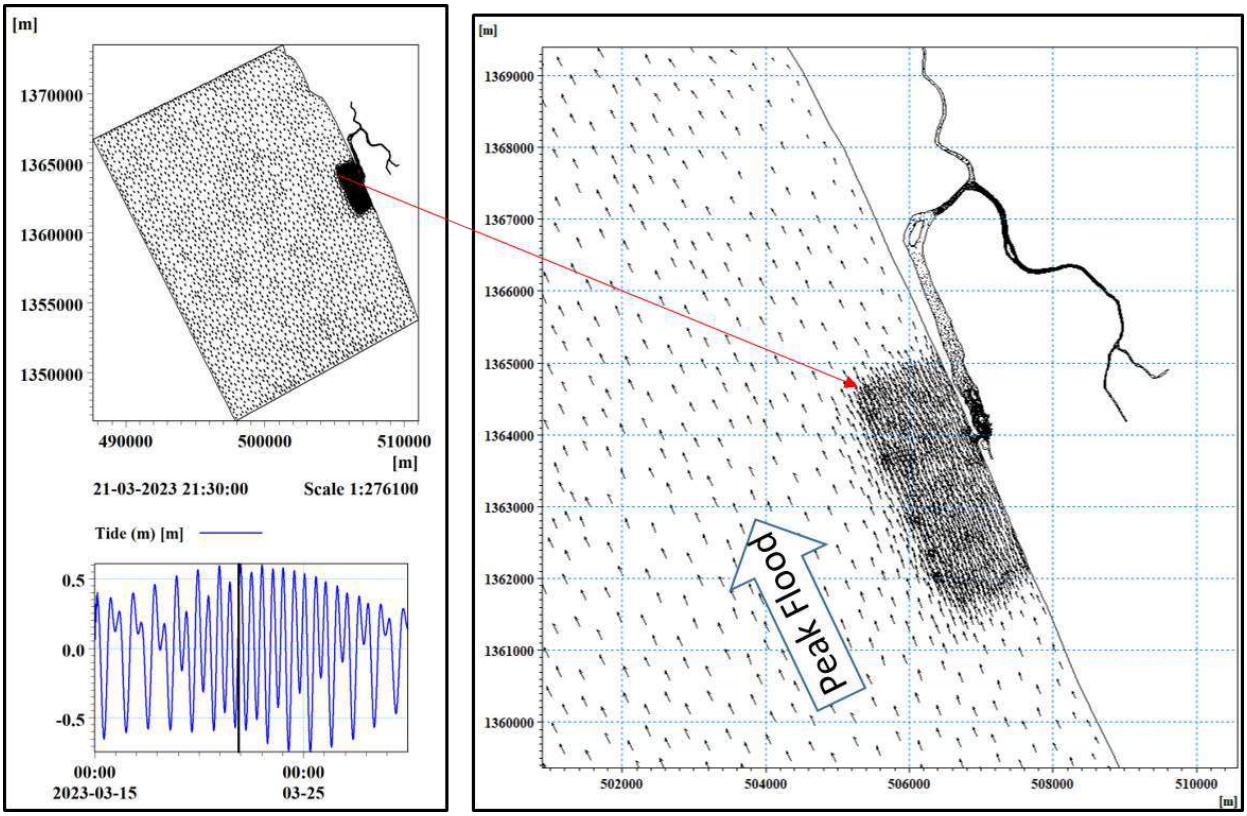


Figure 10: Flow field during peak flood-Non-monsoon season (Existing)

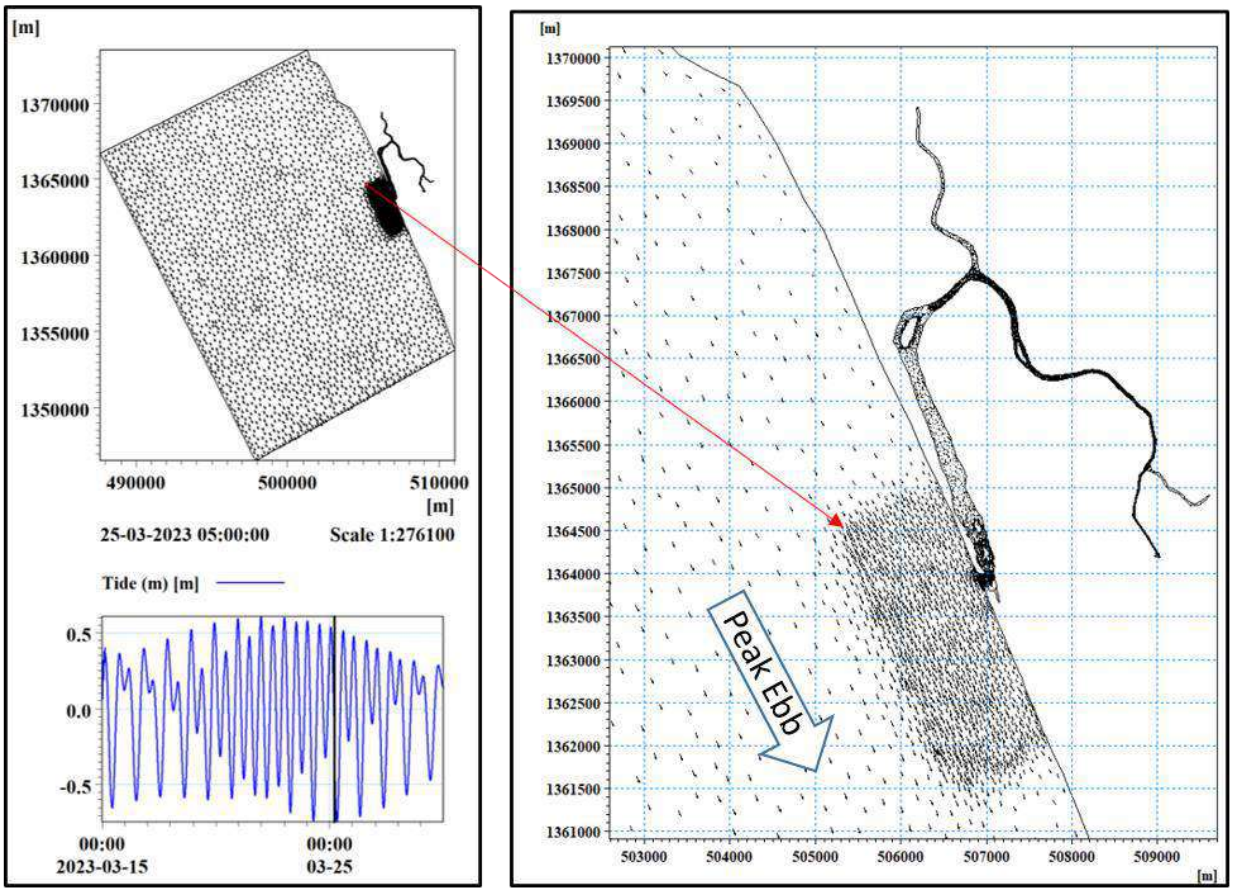


Figure 11: Flow field during peak ebb -Non-monsoon season (Existing)

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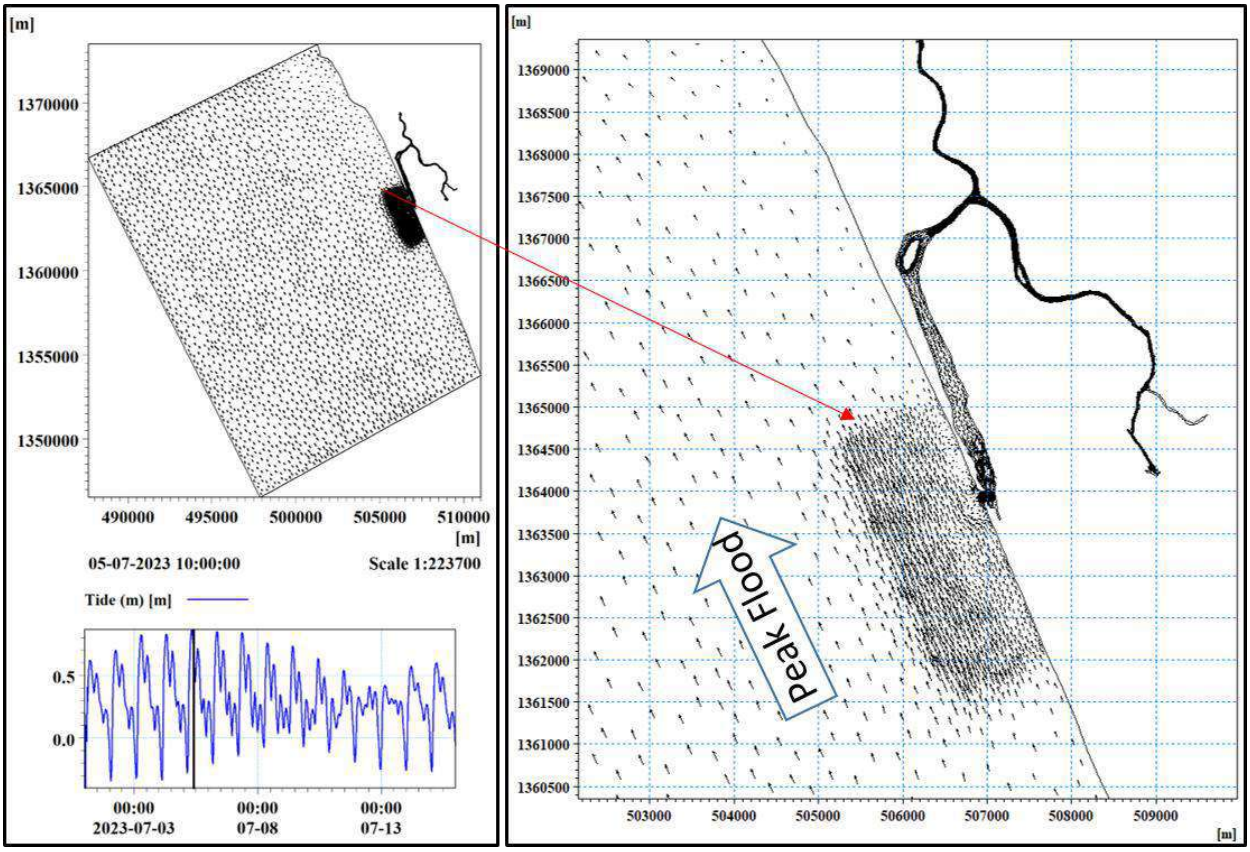


Figure 12: Flow field during peak flood- Monsoon season (Existing)

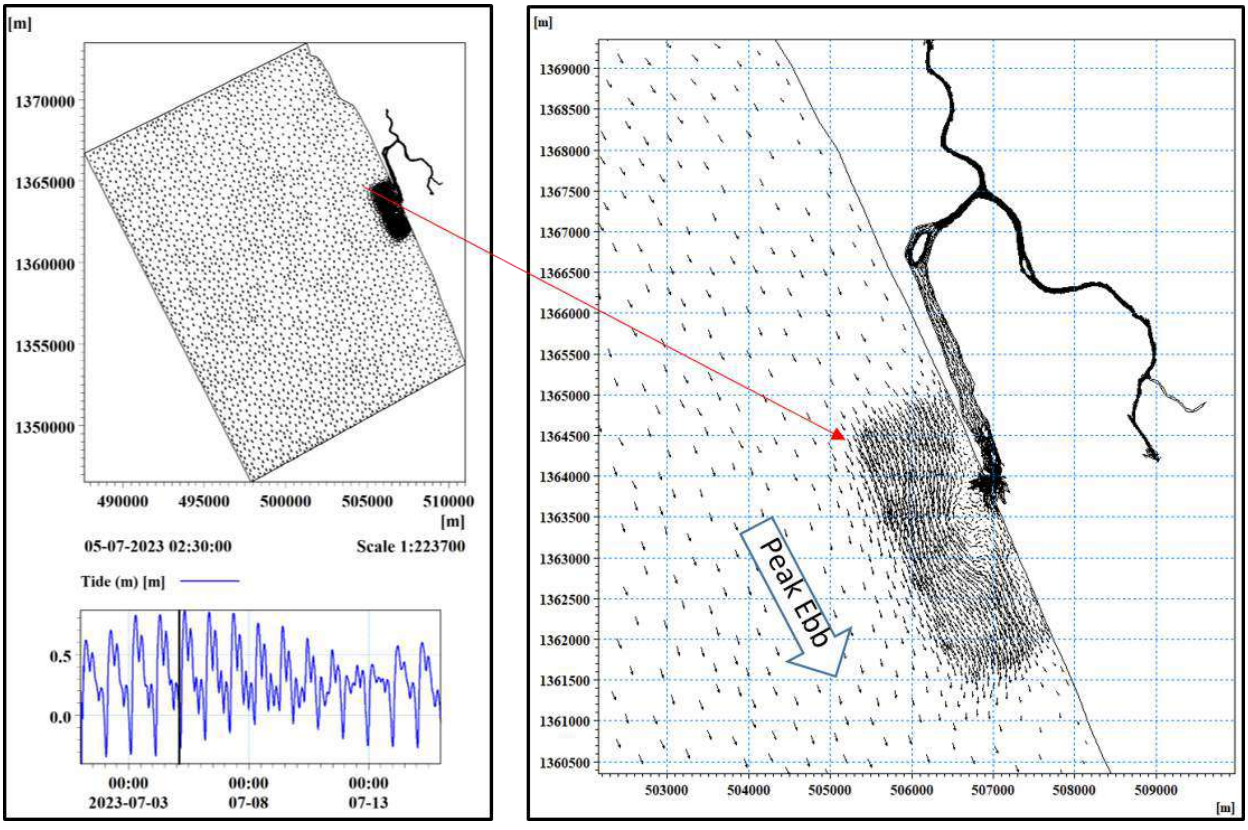


Figure 13: Flow field during peak ebb- Monsoon season (Existing)

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The length of the vector gives magnitude of the current while the arrowhead shows the direction of flow. During peak flood, flow follows natural contour parallel to the coastal. The observed data of tides and current are provided at two points (P1 and P2) in the study area by the HED. Point P1 and Point P2 is located along the river and sea side of the computational domain respectively. The details of geographical location of P1 and P2 is discussed above in section 3. These two points are used for the purpose of comparison of modelled tides and currents against the observed values. The observed data of tides and currents at P1 and P2 are obtained during non-monsoon season only. The comparison of computed tides against the field values during non-monsoon season is shown in Fig. 14.

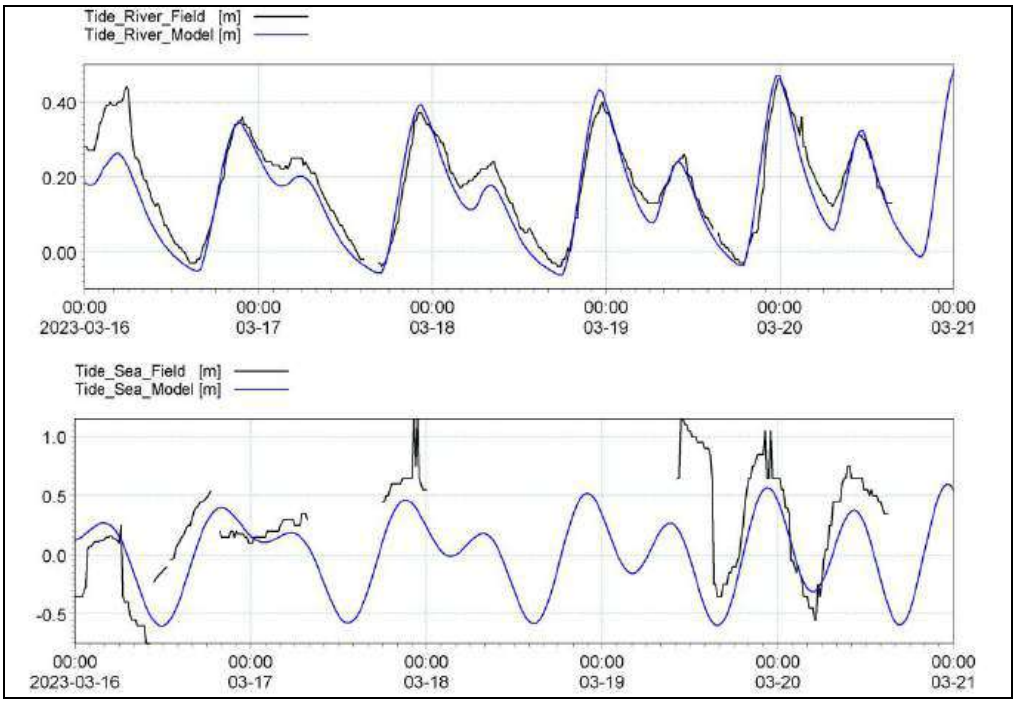


Figure 14: Comparison of tides (Field Vs Computed)

From the Fig.14, it is observed that there is good correspondence between the computed and field values of tides at the point P1. The good correspondence at P1 signifies the efficacy of model calibration. Due to the inherent ambiguity of the field current data at P1 and P2 provided by the PA, it is not possible to compare the computed values of currents at P1 and P2 against the field data. However, modelling results of currents shows that peak values of currents are captured more accurately by the model. Hence, there is good correspondence of computed peak current with the field peak currents. The peak of field current is 0.14m/s and peak of computed current obtained is 0.17m/s at P1. Similarly, at P2 peak of field current is 0.40m/s whereas peak of obtained computed current is 0.39m/s. The littoral drift and sediment pattern studies for the existing condition is discussed below

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6.3 Littoral Drift Studies

Littoral drift studies are necessary for mapping the littoral distribution and changes in shoreline at the proposed location of fishing harbour. The littoral drift at this study area was carried out by CWPRS in the year 2016. The simulation results of the littoral studies were already reported vide Technical Report: - T.R. No. 5357 of 2016. The study reveal that annual southward and northward transports are 0.531Mm^3 and 0.118Mm^3 respectively with the net and gross transports being 0.413Mm^3 and 0.649Mm^3 respectively. Other findings of the study reveal that shoreline evolution in 10 years period will result in accretion on the northern side (68m in cross shore direction) and southern side (40m in cross-shore direction) of the proposed northern and southern breakwater respectively. This accretion and erosion is expected to extend further upto 2500m and 1500m towards along the shore towards north and south direction respectively. The shoreline evolution over the years for accretion and erosion is shown in Fig.15. Taking into consideration the influential role of silt and clay (mud) on sedimentation, in the present study, Mud Transport (MT) is modelled using MIKE 21 MT for identifying the spatially varying zones of sedimentation.

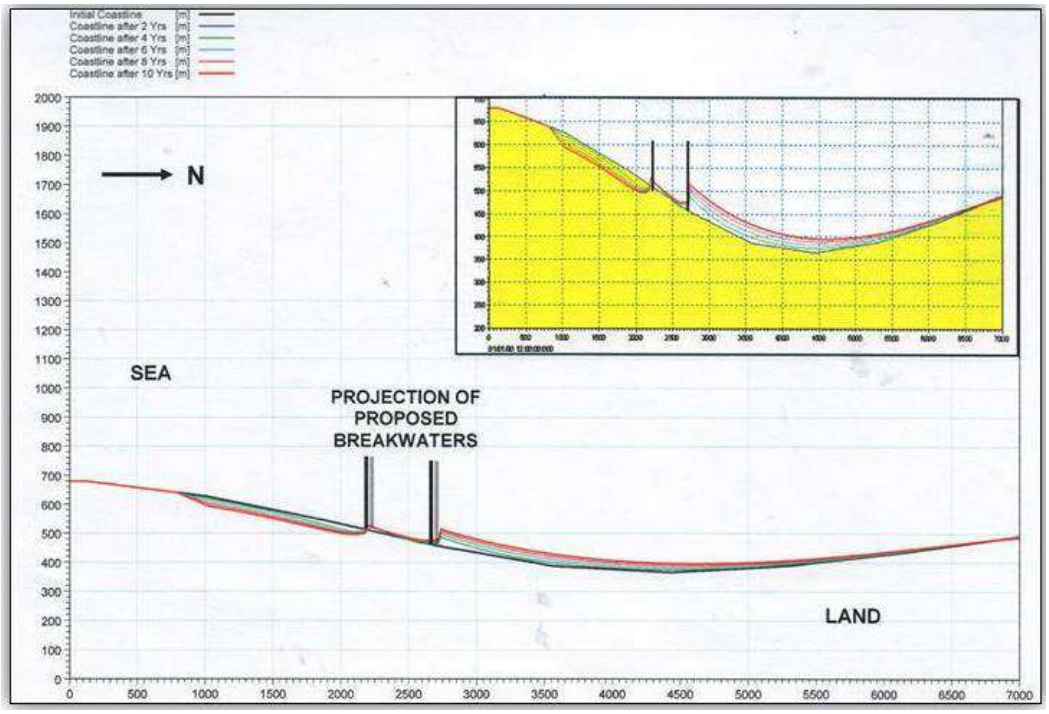


Figure 15: Shoreline evolution after 2nd,4th ,6th,8th and 10th year

6.4 Sedimentation Pattern - Existing Condition-non-monsoon and monsoon seasons

The sedimentation studies were carried out for the existing conditions for both non-monsoon and monsoon seasons using MIKE21 MT module. The results of hydrodynamic studies is one of the important inputs for sedimentation modelling using MIKE21 MT . Other inputs required are SSC and bed sample data in the study area. The data of SSC and bed sample are given by

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HED for non-monsoon season. For monsoon season 50% increased SSC fraction of non-monsoon season is assumed to be adopted as input for sedimentation modelling. Using these inputs in the MIKE 21 MT model, sedimentation studies were carried out for the existing condition for a period of one month. The sedimentation patterns during non-monsoon and monsoon seasons are shown in Fig. 16 and Fig. 17 respectively. During monsoon period with the elevated discharge of Chittari River, flushing out of sediments deposited during non-monsoon period is observed. The estimated deposition (maximum) of about 0.1m in a year over the computational domain is obtained. The annual sedimentation estimated at the river mouth is about 0.021m for the existing condition.

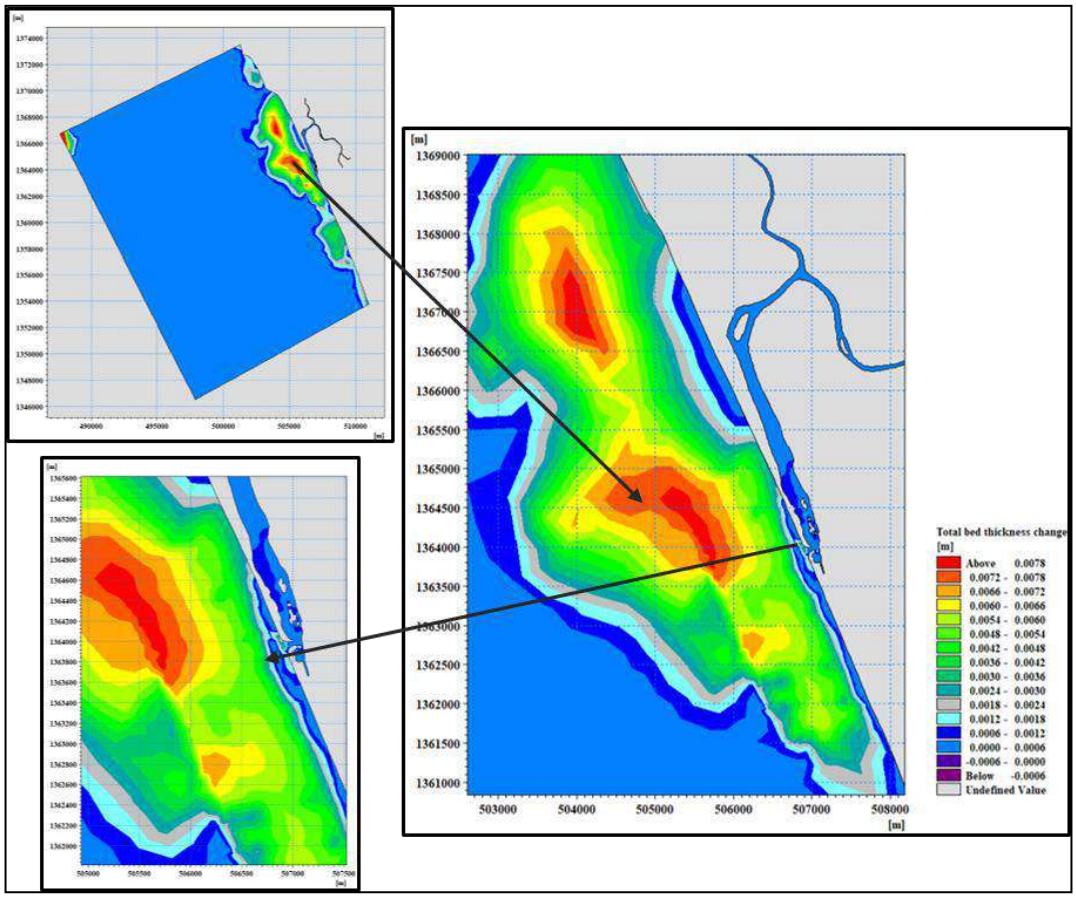


Figure 16: Sedimentation pattern during Non-monsoon season (Existing)

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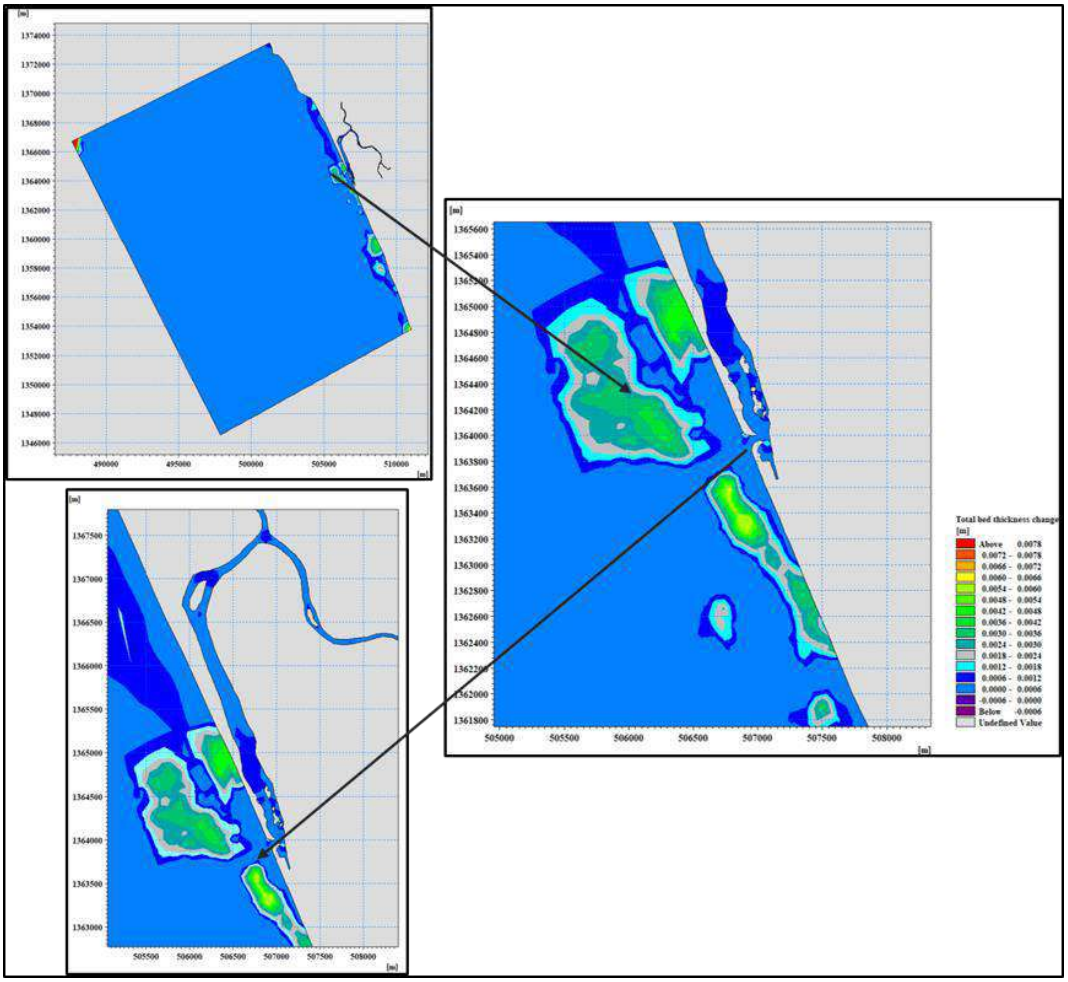


Figure 17: Sedimentation pattern during Monsoon season (Existing)

6.5 Simulation of Flow Field - Proposed Condition-non-monsoon and monsoon seasons

The calibrated model setup of existing condition was re-established by incorporating the features of the proposed layout. The layout consists of 1150m long north breakwater, 425m long south breakwater, 435m breakwater as a river training work & dredging (-2m) inside the approach channel nearer to the Chittari river mouth and suitable dredging along the river. The layout also consists of dredging of -4m inside the proposed fishing harbour. The bathymetry after re-establishing the proposed layout is shown in Fig. 18.

The computation domain with the unstructured mesh developed for the proposed layout is shown in Fig. 18. The mesh resolution considerations are the same as discussed in the section 6.1.

The flow is modelled during non-monsoon and monsoon seasons following the similar procedure and boundary condition constraints as adopted for simulating the flow conditions for the existing conditions. MIKE 21 HD module is again simulated to get the outputs of tides and currents for the proposed layout.

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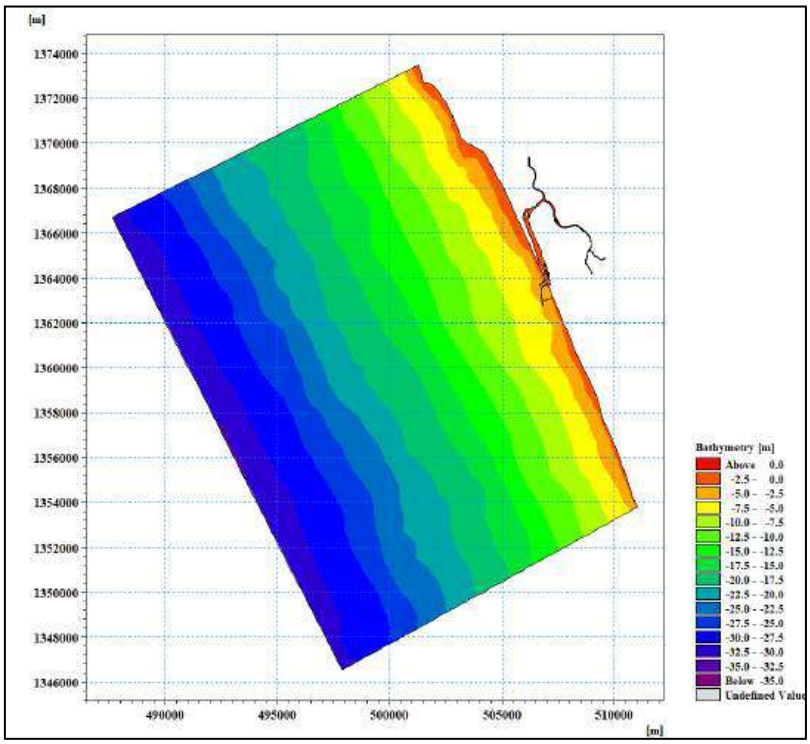


Figure 18: Bathymetry with proposed layout

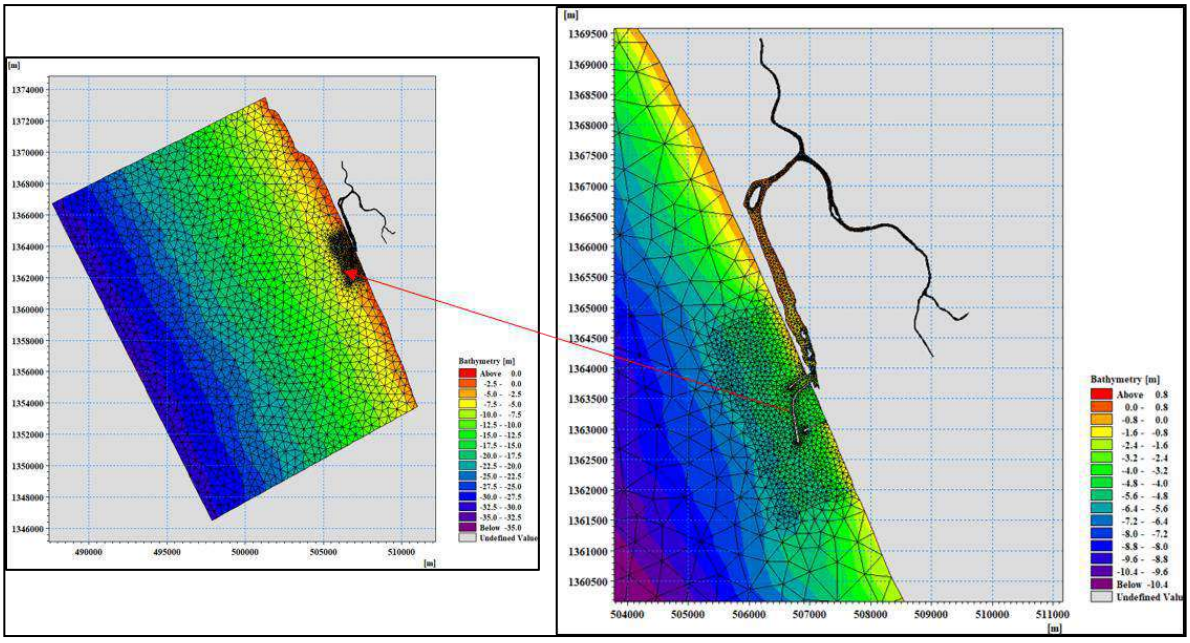


Figure 19: Computational domain for proposed layout

The flow fields along the model domain obtained for non-monsoon and monsoon seasons during peak flooding and ebbing tidal phases are shown from Fig. 20 to Fig. 23. During non-monsoon season, it is observed from the flow fields that circulation is formed near south breakwater during ebbing phase of tide. However, during monsoon season, circulation is formed near south breakwater (during flooding and ebbing phase of tide). In addition, during flooding phase, circulation is formed at 2 other locations (near north breakwater and entrance of river mouth) also. Though eddies formed around the circulation are weak, its intensity may

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change according to changes in local climate. Furthermore, four points t1, t2, t3 and t4 called as monitoring stations are considered for assessment of changes in currents after construction of proposed layout. The locations of these four monitoring stations are shown in Fig. 24.

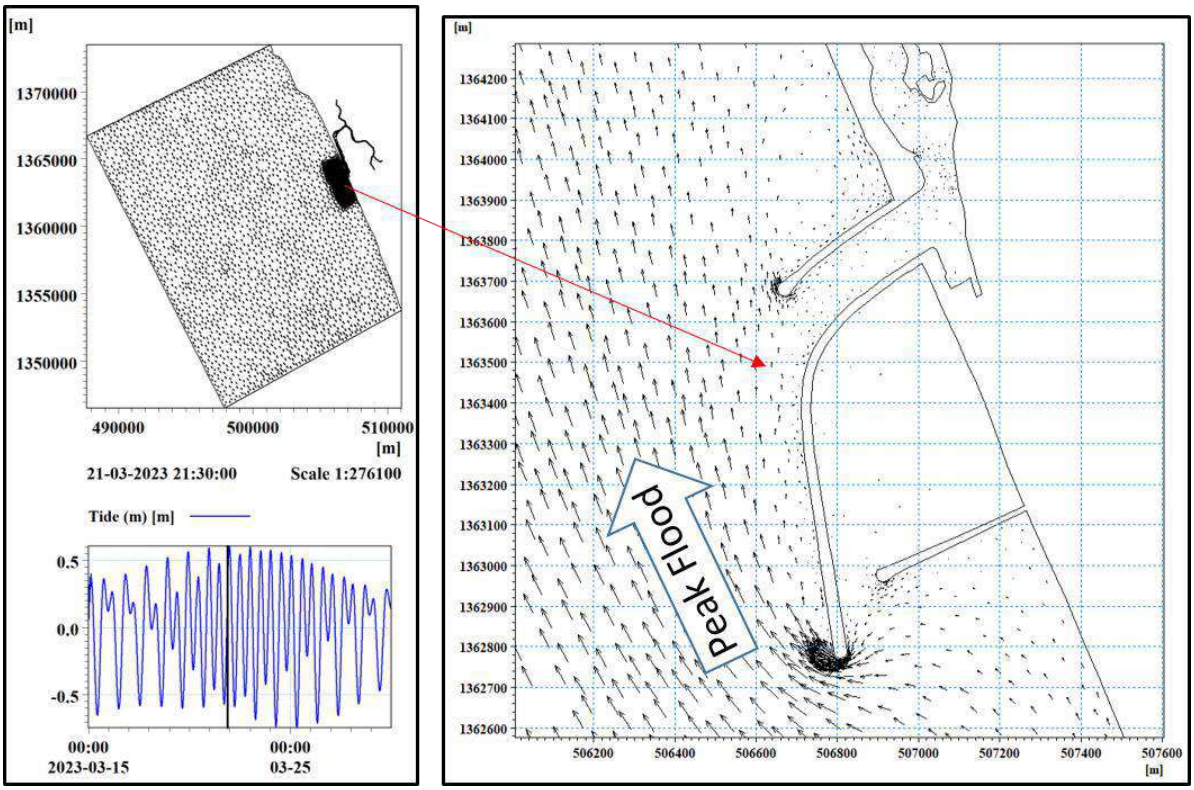


Figure 20: Flow field during peak flood-Non-monsoon season (Proposed condition)

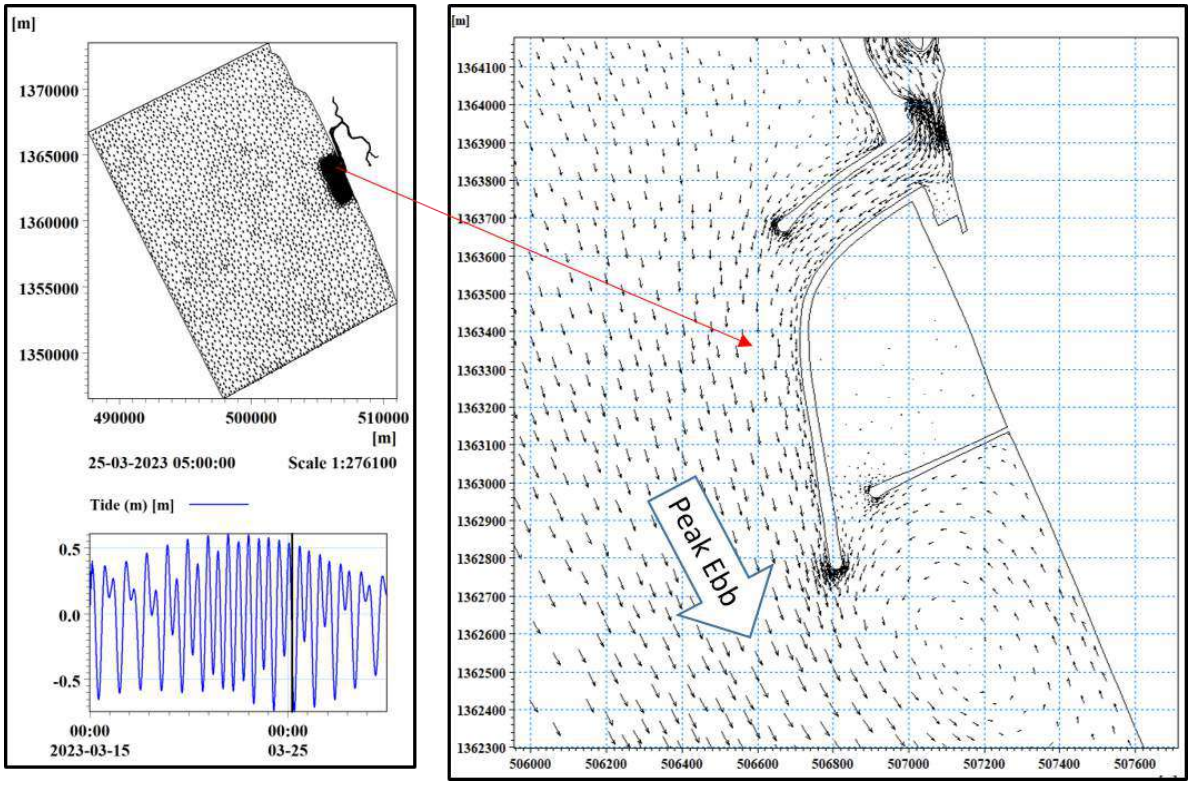


Figure 21: Flow field during peak ebb -Non-monsoon season (Proposed condition)

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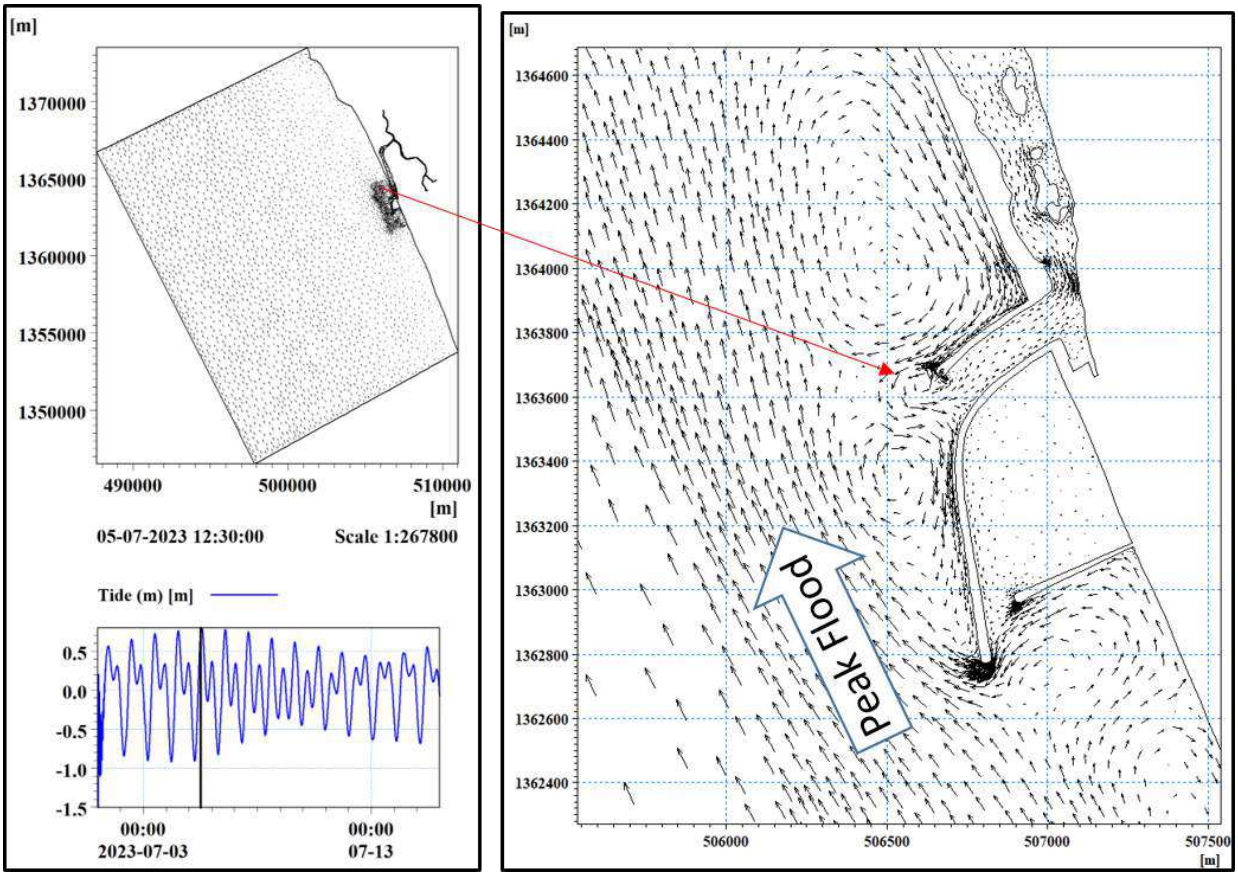


Figure 22: Flow field during peak flood- Monsoon season (Proposed condition)

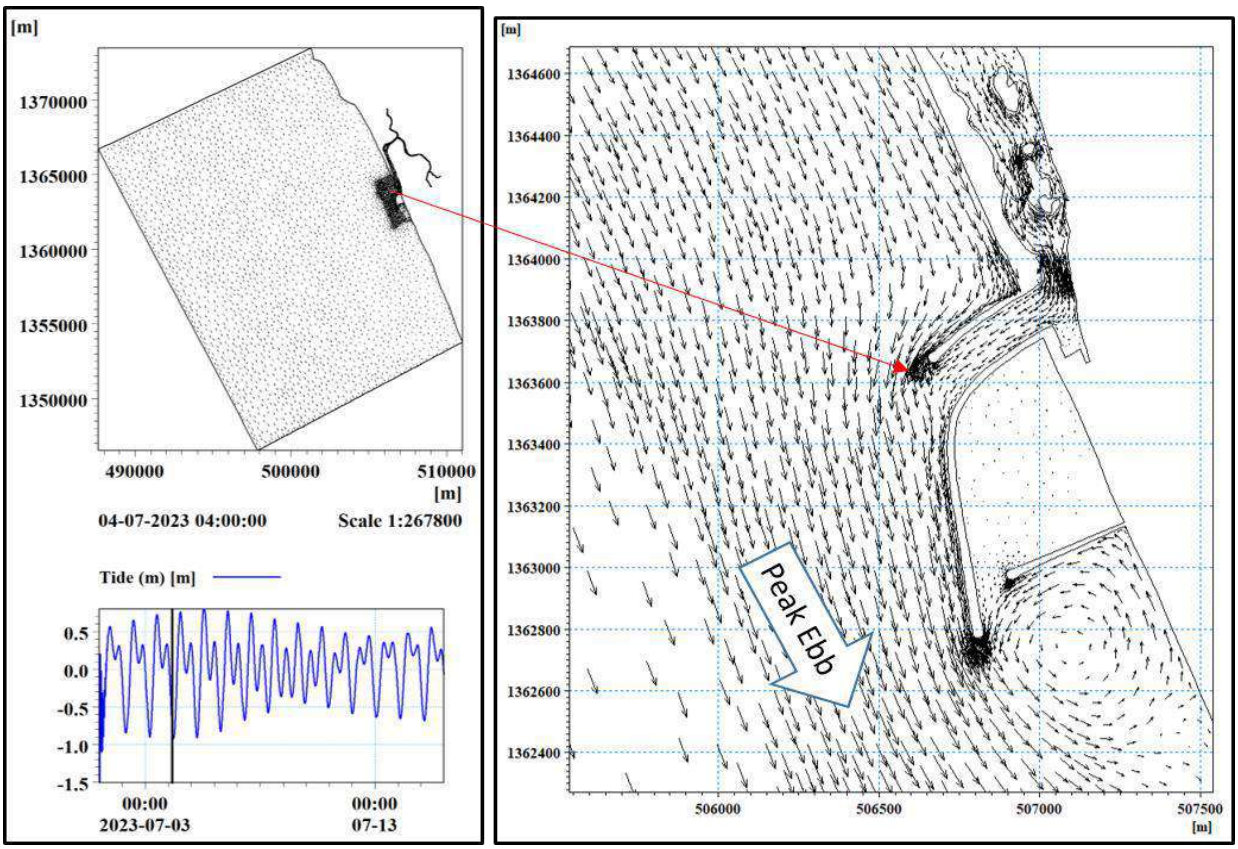


Figure 23: Flow field during peak ebb- Monsoon season (Proposed condition)

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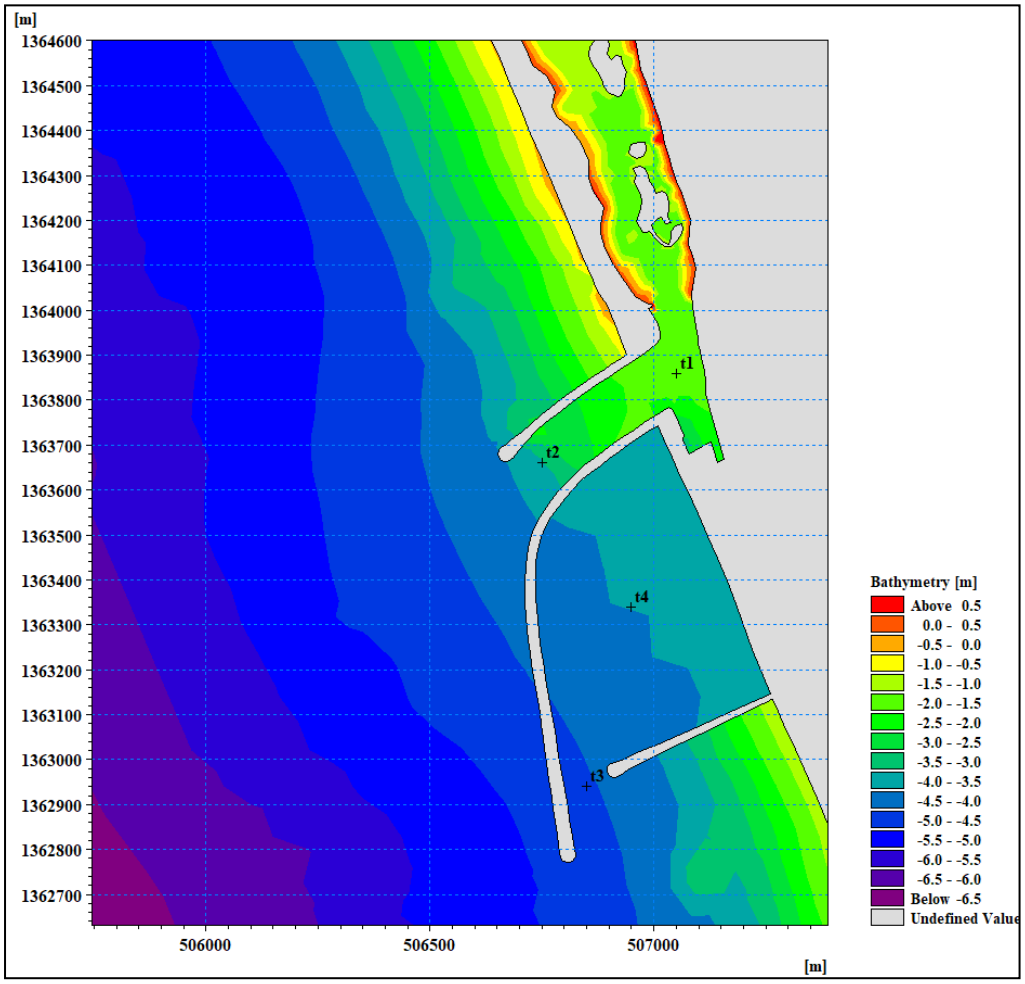


Figure 24: Details of proposed layout with monitoring stations

The computed currents during non-monsoon and monsoon period at all monitoring stations obtained for the proposed layout is compared against the computed currents at corresponding points for the existing condition. The comparison is shown in Fig. 25 and Fig. 26. It is observed from Fig. 25 and Fig. 26 that both during non-monsoon and monsoon season only at the monitoring station t1, there is increase in magnitude (from 0.007 m/s to 0.1m/s during non-monsoon and from 0.015m/s to 0.3m/s during monsoon season) of currents after the proposed construction work. At t2, t3 and t4, the magnitude of currents is significantly reduced after the proposed development. During non-monsoon season, the peak modelled currents at t2, t3 and t4 for existing condition are 0.43m/s, 0.38 m/s and 0.39 m/s respectively. After the proposed development the currents at these three monitoring stations are reduced to 0.11m/s, 0.06m/s and 0.008m/s. However, during monsoon season, at t2, t3 and t4 for existing conditions, the peak modelled currents are 0.55m/s, 0.46m/s and 0.49m/s respectively. The currents at t2, t3 and t4 are reduced to 0.21m/s, 0.11m/s and 0.003m/s after proposed development during monsoon season.

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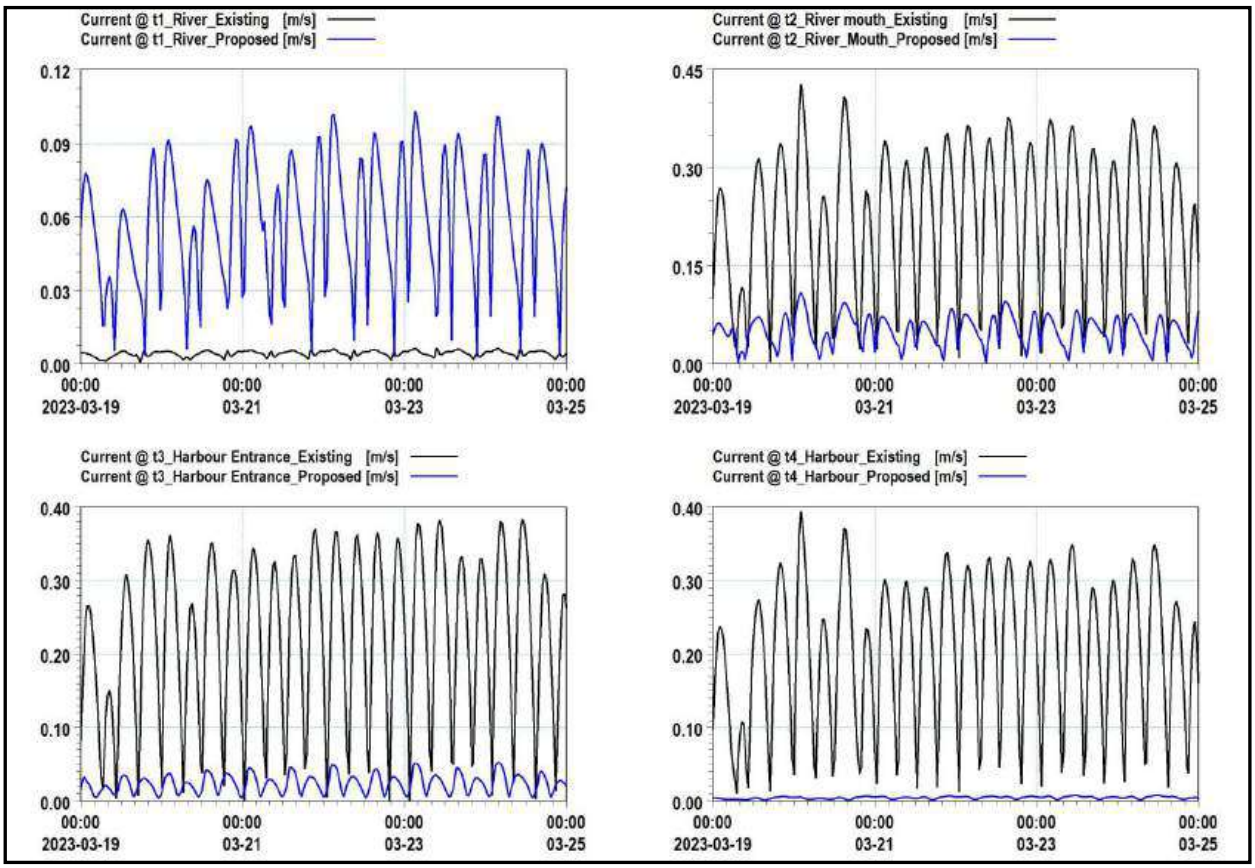


Figure 25: Currents at monitoring stations during Non-monsoon season
(Existing Vs Proposed condition)

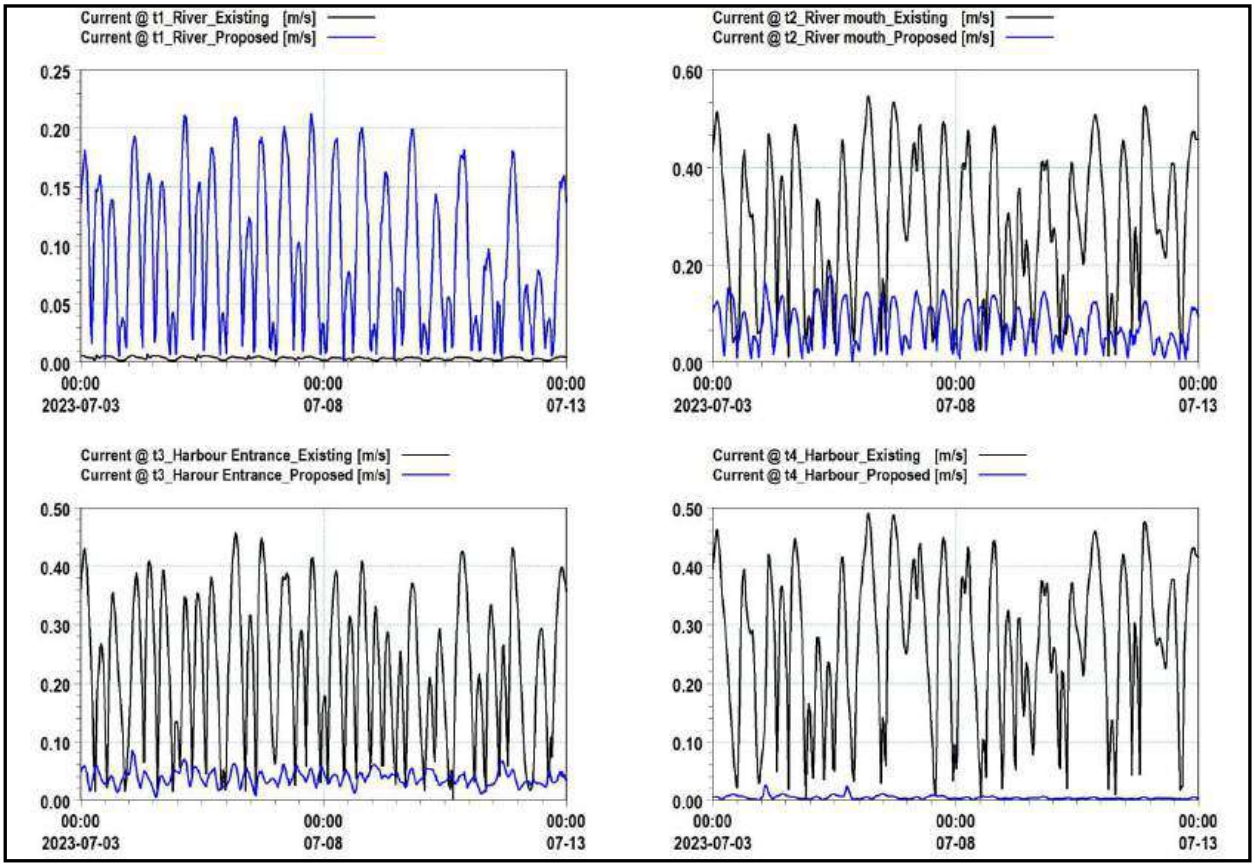


Figure 26: Currents at monitoring stations during Monsoon season
(Existing Vs Proposed condition)

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6.6 Sedimentation Studies – Proposed condition- non-monsoon & monsoon seasons

The sedimentation studies were carried out for the proposed conditions for both non-monsoon and monsoon seasons by using MIKE 21 MT module over a period of one month. The sedimentation pattern during non-monsoon and monsoon seasons are shown in Fig. 27 and Fig. 28 respectively. During the monsoon season, there is slight increase in deposition (Fig. 28) at the river mouth and below the southern breakwater as compared to non-monsoon season. The annual sedimentation estimated in the Fishing Harbour is about 0.03m and at the North and South side of the proposed development annual sedimentation is estimated to be about 0.05m. The annual sedimentation estimated at the river mouth is about 0.045m for the proposed condition. The deposition of sediments near the north and south breakwater is majorly due to formation of circulation at these locations.

The sedimentation estimated is slightly higher in the river mouth region for the proposed condition as compared to the existing condition. The minor increase in sedimentation for the river mouth of proposed condition can be attributed to decrease in currents after establishing the proposed layout.

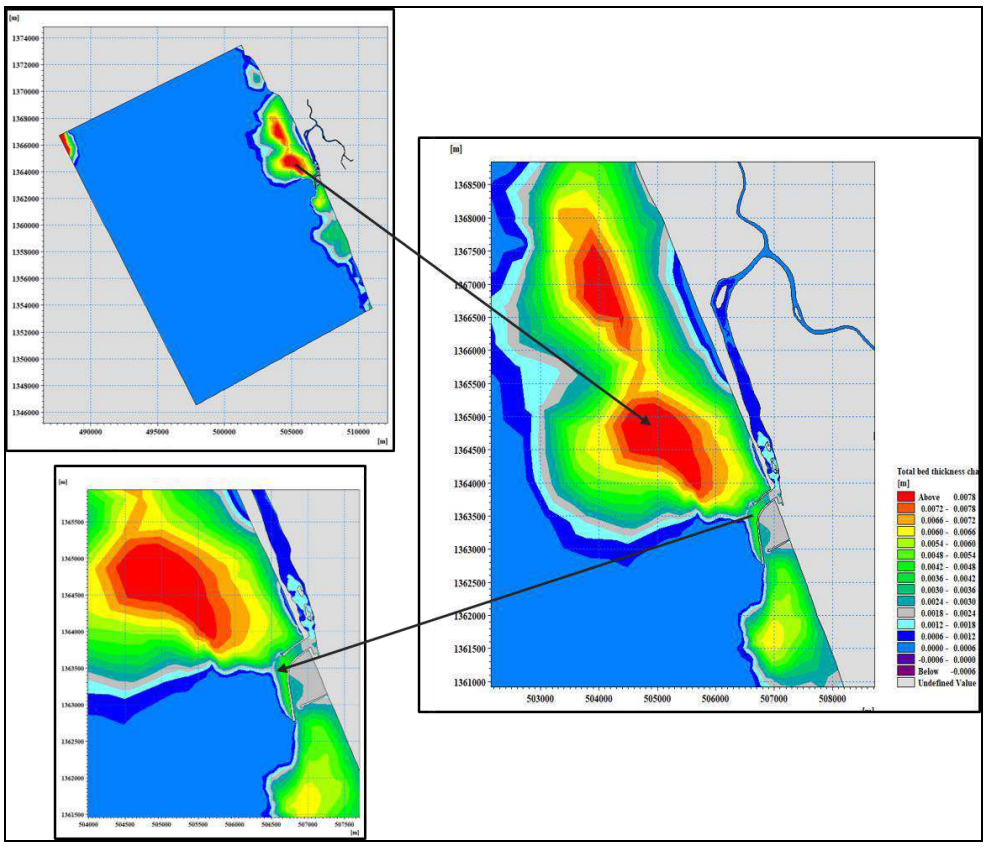


Figure 27: Sedimentation pattern during Non-monsoon season (Proposed)

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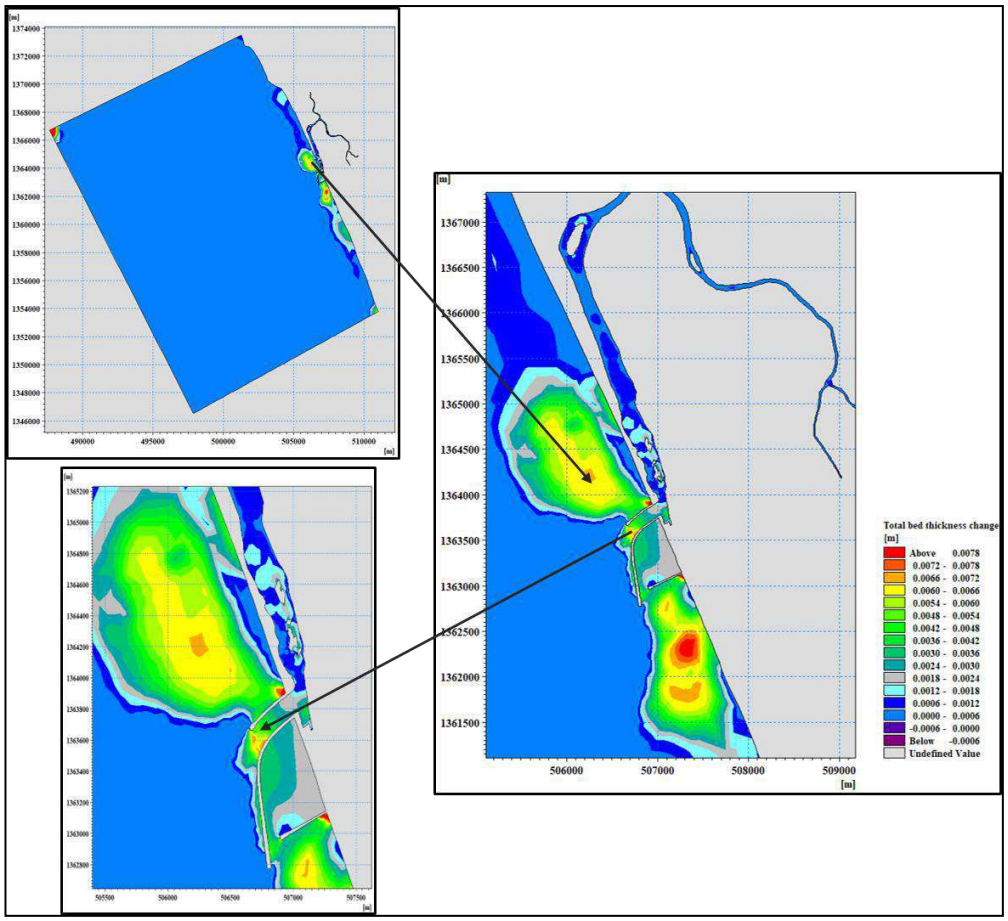


Figure 28: Sedimentation pattern during Monsoon season (Proposed)

6.7 Effect of Littoral Drift

Due to littoral drift, accretion and erosion are taking place on the north and south sides of the proposed development, respectively. The shoreline evolution after 10 years is predicted as accretion on the northern side extending up to 2500m along the shore and about 68m in cross-shore direction, and as erosion on the southern side extending up to 1500m along the shore and about 40m in cross-shore direction. It is observed that the shifting of the river mouth is about 200m towards the north over a year. If the shifting of the river mouth is pronounced after the proposed development of the river training works then a seawall of appropriate length may be provided to arrest the shifting of the river mouth. Similarly, if the erosion on the south side of the proposed fishing harbour is progressive after the development then a suitable shore protection measure in the form of a seawall or series of groynes may be provided.

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7.0 CONCLUSIONS

The mathematical modelling studies for the proposed fishing harbour at Ajanur are undertaken. The simulations of hydrodynamics and sedimentation are performed for the existing conditions and for the proposed layout. Both non-monsoon and monsoon seasons are considered. The major conclusions of the study are given below:-

(i) In the existing condition, the hydrodynamic model results during non-monsoon season shows good calibration of the model with the field observed data.

(ii) The sedimentation studies for the existing condition shows some promising results of sedimentation pattern. Under the existing conditions, the estimated annual sedimentation i.e., depth of deposition is about 0.021m at the river mouth.

(iii) For the proposed development, due to dredging in the proposed area, modelling studies shows decrease in the currents in most of the area of study region (monitoring stations t2, t3 and t4) as compared to the existing condition.

(iv) The sedimentation pattern for the proposed condition shows sedimentation of the order of 0.045m per annum near the river mouth. Sedimentation is also noticed near the north and the south breakwaters (0.05 m in a year). In the fishing harbour area sedimentation of about 0.03 m in a year is estimated.

(v) If the erosion on the south side of the proposed fishing harbour is progressive after the development then a suitable shore protection measure in the form of a seawall or series of groynes may be provided.

(vi) If the shifting of the river mouth is pronounced after the proposed development of the river training works then a seawall of appropriate length may be provided to arrest the shifting of the river mouth.

(vii) The capital dredging in the fishing harbour area, in the river mouth and along the river is calculated to be about 1.1Mm^3. During the construction phase there are debris getting deposited in the dredged area. Therefore, this factor should also be considered for effective planning of construction. Also, maintenance dredging should be carried out near the river mouth and at the harbour entrance to maintain the desired depth for smooth movement of marine vessels.

(viii) The study suggest a proposed layout consisting of 1150m long north breakwater, 425m long south breakwater and 435m breakwater as a river training work near the mouth of Chittari river.

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Annexure-I








Photographs at Ajanur Fishing Harbour

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WAVE FLUME STUDY REPORT

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जल संसाधन, नदी विकास और गंगा संरक्षण विभाग

DEPARTMENT OF WATER RESOURCES, RIVER DEVELOPMENT AND GANGA REJUVENATION

केंद्रीय जल एवं विद्युत अनुसंधान शाला

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CENTRAL WATER AND POWER RESEARCH STATION

PUNE – 411 024

तटीय अभियांत्रिकी संरचनाएं प्रभाग

COASTAL HYDRAULIC STRUCTURES DIVISION

तकनीकी रिपोर्ट संख्या :6177

नवम्बर, 2023

TECHNICAL REPORT NO :6177

NOVEMBER, 2023

केरल के कासारगोड जिले में स्थित अजानूर में मत्स्यन बंदरगाह के लिए तरंगरोधक के डिजाइन के लिए डेस्क और तरंग फ्लूमिका अध्ययन

DESK AND WAVE FLUME STUDIES FOR THE DESIGN OF BREAKWATER FOR FISHERY HARBOUR AT AJANUR IN KASARGOD DISTRICT, KERALA

Dr. R.S. Kankara
Director

REPORT DOCUMENTATION SHEET	
Technical Report No. 6177	**Date: NOVEMBER, 2023**
Title: DESK AND WAVE FLUME STUDIES FOR THE DESIGN OF BREAKWATER FOR FISHERY HARBOUR AT AJANUR IN KASARGOD DISTRICT, KERALA	
Officers Responsible for Conducting the Studies: These studies were conducted by Shri B. R. Tayade, Scientist 'D' with the assistance of Dr. Praveen K. M., Scientist 'B', Shri S. P. Jagtap, Assistant Research Officer, Shri G. R. Pardeshi, Shri Deepak Sharma, Research Assistants, Shri Sushant Gupta, LA-II under the supervision of Dr. J. Sinha, Scientist 'E' & Shri A. V. Mahalingaiah, Scientist 'E' and Dr. Prabhat Chandra, Additional Director and overall guidance of Dr. R. S. Kankara, Director, CWPRS, Pune. Shri Prabhakar Chary, Scientist 'C', Mrs. R.B. Ananda, Scientist 'B', Mrs. M. C. Pawar, Assistant Engineer, Shri Yognath, J.E. of RSWG group were associated, while conducting the wave flume studies at CWPRS.	
Name and Address of Organization Conducting the Studies **Coastal Hydraulic Structures Division** **Central Water and Power Research Station, Pune, India**	
Name and Address of Authority Sponsoring the Studies: **Chief Engineer,** **Harbour Engineering Department,** **Kamaleswaram, Manacaud,** **Thiruvananthapuram** **Kerala – 695009**	
Synopsis Harbour Engineering Department, Government of Kerala has a proposal to develop a fishing harbour at Ajanur. In view of this, Chief Engineer, Harbour Engineering Department, Govt of Kerala referred hydraulic model studies to CWPRS for the proposed fishing harbour at Ajanur. The studies were undertaken and the Mathematical Model Studies for wave tranquility at the proposed fishing harbour at Ajanur was carried out at CWPRS, Pune. Based on the Mathematical Model Studies, it was suggested to construct 1150 m long north breakwater and 425 m long south breakwater. Accordingly, desk & wave flume studies were conducted to evolve the cross-section of breakwater based on the actual site survey data and other hydraulic parameters. Design of breakwater with tetrapods in the armour was evolved based on the desk and wave flume studies. The design of breakwater at -4.50 m bed level consists of 6.0 t tetrapod in the seaside armour placed on 1:2 slope in double layer from el. +0.0 m to el. +7.0 m. A 7.0 m wide and 0.5 m thick crest slab with 0.5 m thick parapet wall is proposed at el. +6.5 m. The top of crest slab and parapet wall is kept at el. +7.0 m and +8.0 m respectively. A 6.0 m wide toe-berm is provided at el. +0.0 m consists of 2.0 t to 3.0 t stones with a sea side slope of 1:2. The hydraulic stability tests were conducted in the wave flume by reproducing the section to a Geometrically Similar (GS) model scale of 1:29. For the design of breakwater, water level of 2.60 m was considered as the Design Water Level (DWL), 1.40 m above the HWL (Storm Surge + Sea level rise). The significant wave height of 4.0 m was considered for the design of breakwater.	
Keywords Breakwater, Storm Surge, Armour, Tetrapod's, Toe-Berm etc.	

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DESK AND WAVE FLUME STUDIES FOR THE DESIGN OF BREAKWATER FOR FISHERY HARBOUR AT AJANUR IN KASARGOD DISTRICT, KERALA

TECHNICAL REPORT NO. 6177	MONTH: NOVEMBER, 2023

1.0 INTRODUCTION

Ajanur village (Latitude 12.33° N and Longitude 75.18° E) in Kasargod District of Kerala is situated on the west coast of India, 15 km south of the district headquarter (Fig. 1). Harbour Engineering Department, Government of Kerala has a proposal to develop a fishing harbour at Ajanur. In view of this, Chief Engineer, Harbour Engineering Department, Govt of Kerala has referred hydraulic model studies to CWPRS for the proposed fishing harbour at Ajanur.

Based on these requirements, Mathematical Model Studies for wave tranquility for the proposed fishing harbour at Ajanur was carried out at CWPRS, Pune (Technical Report No. 5436 of Nov 2016). As per the layout no. 4 suggested in CWPRS Technical Report the harbour basin area comes out to be about 19 ha. Considering the suggestions given by the Technical Sanction committee of PMMSY schemes, Harbour Engineering Department proposed to increase the basin area upto 26 ha. Accordingly, Additional Mathematical Model Studies for wave tranquility (CWPRS Technical Note, July 2022) has been carried out for the proposed increased area. Based on the Mathematical Model Studies, it was suggested to construct 1150 m long north breakwater and 425 m long south breakwater.

Accordingly, desk studies were conducted for evolving the conceptual cross-section of the breakwater using empirical methods and past experience of CWPRS and considering the hydraulic/site conditions such as bathymetry, tides and waves prevailing at site. Thereafter, the wave flume studies were conducted for assessing the hydraulic stability of the proposed breakwater cross-section at Ajanur, Dist. Kasargod, Kerala.

This report describes in detail the desk & the wave flume studies carried out to evolve design of the breakwater for achieving tranquil condition in the proposed fishing harbour at Ajanur, Kerala.

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3.0 SCOPE OF STUDIES

For the proposed development of fishery harbour at Ajanur in Kasargod district of Kerala, the following hydraulic model studies entrusted to CWPRS by Chief Engineer, Harbour Engineering Department, Thiruvananthapuram:

1. Additional Mathematical Model Studies for wave tranquility for the revised layout of fishery harbour at Ajanur, Kerala.
2. Desk and wave flume studies for the design of breakwater for fishery harbour at Ajanur in Kasargod district, Kerala.

On the basis of Mathematical Model Studies for wave tranquility for the proposed fishery harbour at Ajanur, 1150 m long north breakwater and 425 m long south breakwater are suggested as shown in Fig. 2.

The scope of the present studies includes evolving the conceptual design for the suggested breakwater based on empirical methods and the conditions prevailing at the site. Further, the conceptual design of the breakwater was assessed for its hydraulic stability by conducting wave flume tests for various design wave conditions.

3.0 SITE CONDITIONS

Ajanur village in Kasargod District is situated about 15km south of district headquarter at Latitude 12.33° N and Longitude 75.18° E in Kerala state. Majority of village population belongs to fishermen community. At present, the fisherman are operating their boats in open sea & they are facing difficulties in navigating the vessels due to shallow depth & direct wave action.

In view of this, Harbour Engineering Department, Govt of Kerala has a proposal to construct a fishery harbour south of the Chittari River mouth at Ajanur in Kasargod district, Kerala.

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4.0 DESIGN CONDITIONS

4.1 Tidal Levels

The tides in the region are semidiurnal in nature. The maximum tidal range at Kasargod is about 1.0 m. The tidal currents are generally parallel to the coastline. The following tidal levels at Kasargod have been considered for the wave flume studies (Reference: Admiralty Chart No. 217 of 2019):

Table 1: Normal Tidal Levels at Kasargod, Kerala

Tides	Level w.r.t Chart Datum
Mean Higher High Water (MHHW/HWL)	+1.40 m
Mean Lower High Water (MLHW)	+1.30 m
Mean Sea Level (MSL)	+1.00 m
Mean Higher Low Water (MHLW)	+0.90 m
Mean Lower Low Water (MLLW/LLWL)	+0.40 m

A Design Water Level (DWL) of 2.60 m was considered including MHHW and 1.20 m above the MHHW i.e Storm Surge (0.80 m) + Sea level rise (0.40 m). These water levels are with respect to Chart Datum (CD). The design of breakwater cross-sections was also tested at HWL, MSL and LLWL water levels.

4.2 Design Wave Conditions

The predominant wave direction at proposed site in Kasargod district is SSW. Following design conditions were considered for the stability of the breakwater against wave attack and to provide tranquil condition in the harbour area:

1. Zero-order (0 to 1 %) damage for the significant wave height of 4.0 m at +2.60 m (DWL) and +1.40 m (HWL).
2. Overtopping is not permitted.
3. The wave periods considered for the tests are 8, 10 and 12 seconds.
4. The stability of the section is also to be assessed at an intermediate water level and low water level.

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5.0 DESIGN OF BREAKWATER

The desk and wave flume studies have been conducted for evolving cross-section of the breakwater with tetrapods in the armour layer based on empirical formulae, existing conditions at the site and previous in-house extensive wave flume studies conducted at CWPRS for hydraulic stability of breakwater. The weight of armour units are basically evaluated based on Hudson's formula (as given below):

$$W = \frac{w_r H_s^3}{K_D \times (Sr-1)^3 \cdot \cot\theta}$$

Where,

H_s = Breaking wave height (m)
W = Weight of Armour (t)
w_r = Unit Weight of Armour (t/m^3)
K_D = Stability Coefficient for Breaking Wave Height
S$_r$ = Specific Gravity of Armour relative to Water at the structure (w_r / W_w)
W_w = Unit wt. of sea water (t/m^3)
Cot θ = Slope of armour

The conceptual design cross-section of the breakwater with tetrapods in the armour were evolved based on the desk studies as shown in Fig. 4. The design of breakwater at -4.50 m bed level consists of 6.0 t tetrapod in the seaside armour placed on 1:2 slope in double layer from el. +0.0 m to el. +7.0 m. A 7.0 m wide crest slab with 0.5 m thick parapet wall is proposed with top el. +7.0 m. The top of parapet wall is kept at el. +8.0 m. A 6.0 m wide toe-berm is provided at el. +0.0 m consists of 2.0 t to 3.0 t stones with a sea side slope of 1:2. Secondary layer consists of 0.5 – 1.0 t stones below the armour layer and 200 – 300 kg stones below the toe-berm armour. A 0.30 m thick bedding layer consisting of stones up to 20 kg is provided at -4.50 m bed level.

6.0 HYDRAULIC MODEL STUDIES

6.1 Random Sea Wave Flume

The random sea wave flume having dimensions 90 m (length) x 2 m (width) x 1.50 m (height) was utilised for the wave flume tests as shown in Annexure-I / Photo 1. The system is capable of generating maximum wave height

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of 0.4 m at a water depth of 0.6 m for wave periods ranging between 0.3 and 3 sec. The flume facility is equipped with a fully automated computerised random wave generating system comprising of computer, hydro-servo system and wave board assembly. The command signals are sent by computer to the servo-valve through which pressurised oil supplied by hydraulic power pack flows into the actuator. A *To* and *Fro* motion of the piston drives the wave board, which in turn generates waves in the flume.

6.2 Wave Measurement and Calibration

The wave heights were measured by capacitance type wave probes. A gauge was fixed in front of the model and was analysed by computer. The desired wave conditions in front of the model were obtained by matching of desired spectrum and achieved spectrum by iterative procedure.

6.3 Wave Flume Test Procedure

The cross-section of the breakwater was tested under a normal attack of waves in a 2-D wave flume for its hydraulic stability (Photo 1). The model of breakwater cross-section was constructed to a Geometrically Similar (GS) scale in the wave flume. The dimensions of the random wave flume are 90 m length, 2 m width and 1.5 m depth wherein both regular as well as random waves of desired wave height/wave period and desired standard wave spectrum respectively can be generated. Before starting the test, the number of tetrapods provided in the armour and stones in the toe-berm were counted. After conducting the tests for one-hour duration, the number of tetrapods/stones, if any, displaced from its original position were recorded and percentage of damage to the armour/toe-berm of breakwater was determined. During the test, the extent of splashing/overtopping over the crest was also recorded. The damage is expressed as percentage of number of tetrapods/stones displaced from their position. The percentage of damage is equal to "Number of units displaced/total no. of units used in the respective layer".

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6.4 Model Scale

The model tests for design of cross-section of the breakwater were conducted in 2-D wave flume by reproducing the section to a Geometrically Similar scale of 1:29. The model was based on Froude's criterion of similitude. Various scales obtained are as follows:

Table 2: Scale Ratio for Model Studies of the Breakwater

Model scale 1:29		
Length	$-L_r$	= 1:29
Area	$-L_r^2$	= 1:841
Volume	$-L_r^3$	= 1:24389
Time	$-L_r^{1/2}$	= 1:5.385
Velocity	$-L_r^{1/2}$	= 1:5.385

6.5 Gradation of Stones

Details of various gradations of stones in prototype of the trunk of the breakwater and those used in the model having scale 1:29 are given table 3:

Table 3: Gradation of Stones for Trunk of Breakwater

Prototype		Model (Scale 1:29)	
Average	Gradation	Average	Gradation
2.5 t	2 – 3 t	100 gm	80 to 120 gm
1.5 t	1 – 2 t	60 gm	40 to 80 gm
0.75 t	0.5 – 1 t	30 gm	20 to 40 gm
250 kg	200 – 300 kg	10 gm	8 to 12 gm

6.6 2-D Wave Flume Tests

The cross section of the breakwater, as shown in Fig. 4, was constructed with a Geometrically Similar model scale of 1:29 in the wave flume. Tests were conducted considering both random and regular wave conditions to assess the stability of the breakwater. For random waves, 4.0 m significant wave height (H_s) was considered. To achieve this H_s, Pierson-Moskowitz (PM) spectrum was used for acquiring desired wave height in the 90 m wave flume. For acquiring desired

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regular wave height i.e. non breaking wave height in front of the breakwater, series of wave height analysis was carried out with the help of in-house computer program.

The tests were carried out at CWL, MHHW, MSL & MLWL with various wave conditions. The tests were conducted for one-hour duration each in the model corresponding to about 5.39 hours (approx.) in the prototype. The objectives of the tests were to check hydraulic stability of the breakwater against various wave conditions likely to occur in the vicinity of proposed fishery harbour area at Ajanur, Kasargod district.

The details of the wave flume tests were conducted for breakwater cross-section at -4.50 m bed level with random waves are described as follows:

1) Initially, a test was conducted with random waves at a significant wave height (H_s) of 4.05 m at Design Water Level (+2.60 m) for one hour duration (corresponding to 5.39 hours in prototype) using PM (Pierson-Moskowitz) spectrum. There was no overtopping and moderate splashing observed during the test. The test showed that there was no damage occurred to both armour layer and toe-berm (Photograph No. 2).

2) An endurance test was conducted at Design Water Level (+2.60 m) with random waves using PM (Pierson-Moskowitz) spectrum for the significant wave height of 4.85 m (120% of H_s i.e. 4.80 m) for one hour duration. During the test, it was observed that there was moderate splashing but no overtopping. After conducting the test for one hour duration, no damage was observed in the armour and the toe-berm (Photograph No. 3).

3) Further, a test was conducted with random waves at a significant wave height (H_s) of 4.0 m at the Mean Higher High Water (MHHW) (+1.40 m) for one hour duration using PM (Pierson-Moskowitz) spectrum. There was no splashing and no overtopping observed during the test. After the test, it was observed that there was no damage occurred in the armour as well as in the toe-berm (Photograph No. 4).

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4) Another test was conducted with random waves at a significant wave height (H_s) of 3.97 m at Mean Sea Level (+1.00 m) for one hour duration (corresponding to 5.39 hours in prototype) using PM (Pierson-Moskowitz) spectrum. During the test, no splashing and no overtopping was observed. There was no damage to the toe-berm as well as to the armour observed after the test (Photograph No. 5).

5) A test was conducted with random waves at a significant wave height (H_s) of 3.76 m at Mean Lower Low Water Level (+0.40 m) for one hour duration (corresponding to 5.39 hours in prototype) using PM (Pierson-Moskowitz) spectrum. No splashing and no overtopping were observed during the test. After the test, it was observed that there was no damage to the toe- berm as well as to the armour (Photograph No. 6).

From the past experiences during the model testing, it has been revealed that many-times the structures were also susceptible to undergone damages during the regular wave conditions, therefore the cross-section of breakwater was also tested in the regular wave conditions.

The details of **regular wave testing** on the breakwater cross-section are as follows:

6) A test was conducted, at the Design Water Level of +2.60 m under the attack of regular waves of 10 sec period with wave height ($H_{1/3}$) of 5.0 m. There was minor overtopping and moderate splashing of waves observed during the test. The maximum wave run-up was upto +5.85 m and run-down was up to +0.72 m were observed. After conducting the test under the condition for one hour in the wave flume, no damage was observed in the armour layer and in the toe-berm (Photograph No. 7).

7) A test was also carried out under the attack of regular (monochromatic) waves at Mean Higher High Water (+1.40 m). The duration of test was one hour in the model corresponding to about 5.39 hours in the prototype. The test was conducted for wave height of ($H_{1/3}$) of 5.12 m with 12 second period. During the test, it was noticed that the maximum wave run-up was upto +5.0 m and run-down was up to +0.15 m. There

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was no damage observed to the toe-berm stones and to the armour layer after the test. There was no splashing and no overtopping of waves observed (Photograph No. 8).

8) Further, a test was conducted for one hour duration at Mean Higher High Water (MHHW) of +1.40 m under the attack of regular waves of 10 sec period with wave height (H_{10}) of 5.0 m. During the test, no overtopping and no splashing was observed. The maximum wave run-up was upto +5.10 m and run-down was up to [-] 0.20 m. No damage was observed in the armour layer and in the toe-berm (Photograph No. 9).

9) Another test was conducted for one hour duration at Mean Higher High Water (MHHW) of +1.40 m under the attack of regular waves of 8 sec period with wave height (H_{10}) of 5.0 m. During the test, no splashing and no overtopping was observed. The max wave run-up was up to +4.25 m and run-down up to +0.00 m were observed. After conducting the test, there was no damage observed in the armour layer and toe-berm (Photograph No. 10).

10) A test was also carried out under the attack of regular (monochromatic) waves at Mean Sea Level (+1.00 m). The duration of test was one hour in the model corresponding to about 5.39 hours in the prototype. The test was conducted for wave height of 5.07 m (H_{10}) with 10 second period. During the test, it was observed that the maximum wave run-up and run-down was up to +3.50 m and up to (-) 0.50 m respectively. There was no damage observed in the toe-berm as well in the armour. No splashing and no overtopping of waves were observed (Photograph No. 11).

11) Another test was conducted for one hour duration at Mean Lower Low Water Level (MLLW) of +0.40 m under the attack of regular waves of 10 sec period with wave height (H_s) of 4.80 m. During the test, no splashing and no overtopping was observed. The max wave run-up was up to +3.50 m and run-down up to (-) 1.10 m were observed. After conducting

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the test, there was no damage observed in the armour layer and toe-berm (Photograph No. 12).

All results of tests conducted for the cross-section of the breakwater (trunk portion) are summarized in the Table 4, and photographs of all the tests are enclosed as Annexure-V.

Overall, the cross-section of the breakwater was found stable against the higher wave action at high water level. No damage to the toe-berm and to the armour layer of breakwater were observed during the tests. Therefore, the section was found to be hydraulically stable against the design wave conditions adopted for the design of the proposed breakwater for fishery harbour at Ajanur, Dist. Kasargod, Kerala.

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Table 4: Summary of the Wave Flume Test conducted at RSWS

Name of the Project – Breakwater for fishery harbour at Ajanur in Kasargod district, Kerala
Model Scale = 1:20, Armour Unit = 8.1 Tetrapod, Toe-Berm = Stone (2 – 3 t)
DWL = +2.60 m, MHHW = +1.40 m, MSL = +1.00 m, MLLW = +0.40 m
Test Duration = 1 hour (3.39 Hrs Prototype), Bed Level = -4.50 m
Spectrum - Pierson-Moskowitz Spectrum

Sr. No	Water Level	Wave Height	Splashing	Over-topping	Run-up	Run-down	Damage		Remark	Photograph No.
							Toe-berm	Armour		
Random Wave Tests										
1	DWL	H_s = 4.05 m	Moderate	Nil	N.A.	N.A.	Nil	Nil		3
2	DWL	H_s = 4.85 m	Moderate	Nil	N.A.	N.A.	Nil	Nil	Endurance Test	3
3	MHHW	H_s = 4.8 m	Nil	Nil	N.A.	N.A.	Nil	Nil		4
4	MSL	H_s = 3.97 m	Nil	Nil	N.A.	N.A.	Nil	Nil		5
5	MLLW	H_s = 3.76 m	Nil	Nil	N.A.	N.A.	Nil	Nil		6
Regular Wave Tests										
6	DWL	H_{sig} = 5.0 m	Moderate	Minor	Upto +5.85 m	Upto +0.72 m	Nil	Nil	T = 10 sec	7
7	MHHW	H_{sig} = 5.02 m	Minor	Nil	Upto +5.8 m	Upto +0.15 m	Nil	Nil	T = 12 sec	8
8	MHHW	H_{sig} = 5.0 m	Nil	Nil	Upto +5.10 m	Upto [-]0.30 m	Nil	Nil	T = 10 sec	9
9	MHHW	H_{sig} = 5.0 m	Nil	Nil	Upto +4.25 m	Upto +1.0 m	Nil	Nil	T = 8 sec	10
10	MSL	H_{sig} = 5.07 m	Nil	Nil	Upto +3.90 m	Upto [-]0.53 m	Nil	Nil	T = 10 sec	11
11	MLLW	H_{sig} = 4.80 m	Nil	Nil	Upto +3.50 m	Upto [-]1.32 m	Nil	Nil	T = 10 sec	12

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7.0 RECOMMENDED CROSS-SECTIONS OF THE BREAKWATER

After conducting several tests, the cross-section of the breakwater at -4.50 m bed level was found stable against various wave conditions. The details of the cross-section of the breakwater at various bed levels are as follows:

1)Trunk Portion at -2.0 m Bed Level (to be adopted from -2.0 m to +0.0 m Bed level)

The cross-section is designed for the -2.0 m bed level as shown in Fig. 3. This cross-section may be adopted from -2.0 m to +0.0 m bed level range. The cross-section of the breakwater consists of 2 t tetrapods provided in the armour layer with 1:2 slope on the sea-side from el. +2.20 m to +7.0 m and 0.5 to 1.0 t stones provided in the armour with 1:2 slope on the leeside. A 4.0 m wide toe-berm on the seaside consists of 0.5 to 1 t stones is kept at el. +2.20 m. Secondary layer consists of 200 to 300 kg stones provided below the armour layer and 50 to 100 kg stones provided below the toe-berm and leeside armour. Core consists of 20 to 50 kg stones and 0.30 m thick bedding layer consists of stones up to 20 kg. A PCC crest of 0.5 m thick is provided at el. +6.50 m soffit level with sea-side parapet top at el. +8.0 m. A clear carriageway width of 7 m is provided on the crest slab for the movement of vehicles / machineries in future during the inspection / supervision or maintenance purpose.

2) Trunk Portion at -4.50 m Bed Level (to be adopted from -2.0 m to -4.50 m Bed level)

The cross-section of breakwater at -4.50 m bed level is shown in Fig. 4. The cross-section of the breakwater consists of 6 t tetrapods provided in the armour layer with 1:2 slope on the sea-side from el. +0.0 m to +7.0 m and 1 to 2 t stones provided in the armour with 1:2 slope on the leeside. A 6.0 m wide toe-berm on seaside is kept at el. +0.0 m consists of 2 to 3 t stones. The secondary layer consists of 0.5 to 1.0 t stones provided below the armour layer and 200 to 300 kg stones provided below the toe-berm and 100 to 200 kg stones provided below the leeside armour. Core consists of 20 to 100 kg stones and 0.30 m thick bedding layer consists of stones up to 20 kg is provided at

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-4.50 m bed level. A 7.0 m wide PCC crest slab of 0.5 m thick is provided at el. +5.50 m soffit level with sea-side parapet top at el. +8.0 m.

3) Roundhead at -4.50 m Bed Level

The cross-section and plan of roundhead portion of breakwater at -4.50 m bed level are shown in Figs. 5 & 6 respectively. The section consists of 8 t tetrapods placed in the armour (double layer) on 1:2 slope and are supported with the 6.0 m wide toe-berm consisting of 3 to 4 t stones at el. +0.0 m. A 8.0 m wide PCC crest slab is provided with top el. +8.0 m. A clear carriageway width of 8 m is provided on the crest slab for the movement of vehicles / machineries in future during the inspection / supervision or maintenance purpose. Secondary layer consists of 0.5 to 1.0 t stones provided below the armour layer and below the toe-berm. Core consists of 20-100 kg stones. A 0.3 m thick bedding layer is provided with stones upto 20 kg.

8.0 CONCLUDING REMARKS AND RECOMMENDATIONS

Based on the desk and the wave flume studies carried out for design of the breakwater for fishery harbour at Ajanur in Kasargod District, Kerala, the following concluding remarks are drawn:

1. The recommended cross-section of the breakwater with tetrapods in the armour layer is shown in Fig. 3 to Fig. 6. The cross section is hydraulically stable under the design wave conditions & therefore, recommended to implement at the proposed site.
2. The end of the breakwater should be protected by providing proper roundhead as shown in Figs. 5 & 6. The construction phasing may be adhered, in order to have a safety and economy of the project. If, the construction of the breakwater may not be possible during one season, as such, a temporary roundhead at the end portion may be provided wherever the work is curtailed.
3. The density of concrete and stones to be used for construction of the breakwater should be about 2.4 t / m^3 and 2.6 t / m^3, respectively.

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4. There should not be any deviation from the design during the construction of the breakwater in respect of levels, slopes and weights of the stones.

5. The crest slab and the parapet wall provided at the crest of the breakwater may be constructed monolithically.

6. The packing density of the 2 t Tetrapods, 6 t Tetrapods and 8 t Tetrapods (double layer) in the armour layer of breakwater is 117 Nos., 56 Nos. and 42 Nos. per 100 sq. m. of area. The specification of 2 t Tetrapods, 6 t Tetrapods and 8 t Tetrapods are enclosed as Annexure-II, III and IV respectively.

7. All levels of the proposed breakwater should be correlated with Chart Datum before construction at the site.

8. The grading of the stones to be used in the construction for the breakwater should be as follows :

2 – 3 t stones	-	50% stones should be higher than 2.50 t
1 – 2 t stones	-	50% stones should be higher than 1.50 t
0.5 – 1 t stones	-	50% stones should be higher than 0.75 t
200 – 300 kg stones	-	50% stones should be higher than 250 kg
100 – 200 kg stones	-	50% stones should be higher than 150 kg
20 – 100 kg stones	-	75% stones should be higher than 60 kg

9. The rubble mound structures are flexible structures and it is essential to monitor and maintain them regularly. Therefore, periodic survey of the breakwater and maintenance of the breakwater, as and when any damage occurs may be undertaken.

10. It is suggested to carry out geotechnical investigations to check the probable sinkage at the site before the construction of the breakwater.

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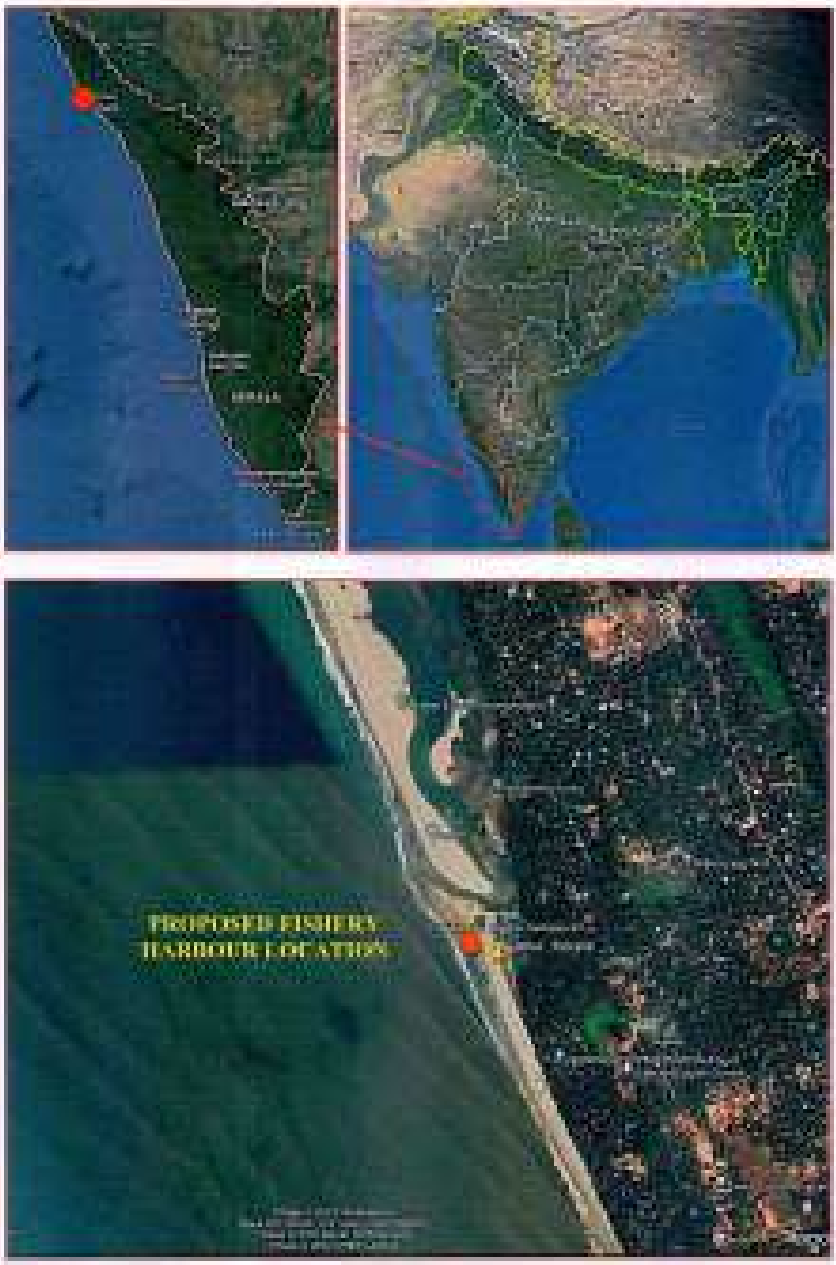


Fig. 1: Index and Location Map of Ajanur, Kasargod District, Kerala.

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Fig. 2: Layout Plan for Proposed Fishing Harbour at Ajanur, Kasargod District, Kerala

Fig. 3: Design Cross-Section of Breakwater at -2.0 m Bed Level at Ajanur, Kasargod District, Kerala

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Fig. 4: Design Cross-Section of Breakwater at +4.50 m Bed Level at Ajanur, Kasargod District, Kerala

Fig. 5: Roundhead Section of Breakwater at +4.50 m Bed Level at Ajanur, Kasargod District, Kerala

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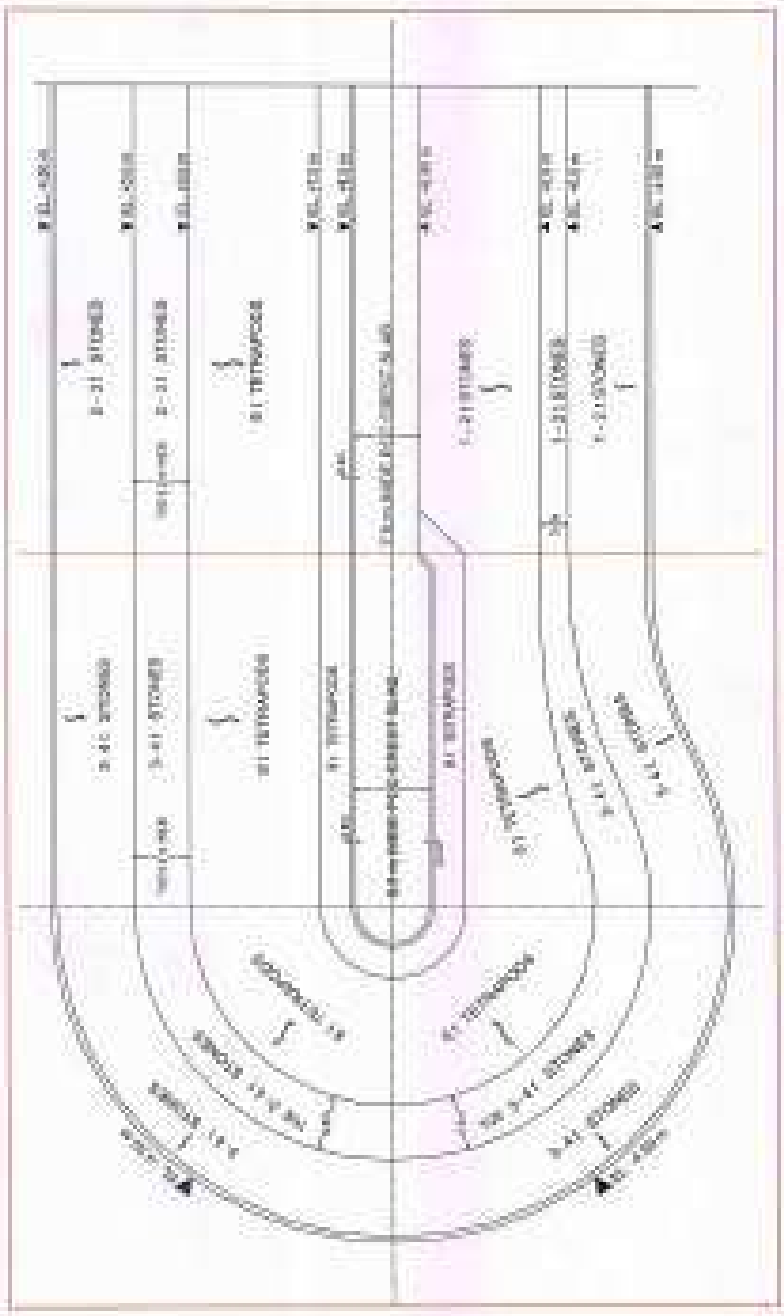


Fig. 6: Plan of Roundhead portion of Breakwater at +4.50 m Bed Level at Ajanur, Kasargod District, Kerala

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Annexure-I
NOT TO SCALE
2 m
90 m
1.50 m
0.50 m
Random Sea Wave Generation Flume (90 m) Facility at CWPRS, Pune
CWPRS Technical Report No. 6122 of November 2003
23

Annexure – II

Specification for 2 t Tetrapod

CWPRS Technical Report No. 8177 of November 2023

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Annexure – III

Specification for 6 t Tetrapod

CWPRS Technical Report No. 6177 of November 2023

TETRAPOD SPECIFICATION

ELEVATION

PLAN

BOTTOM

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Annexure – IV

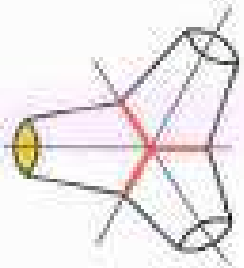
TETRAPOD SPECIFICATION

For 8 T Tetrapod

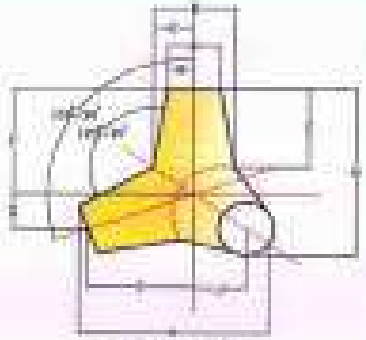
Wt. of Tetrapod	W =	8	T
Density of Concrete	w =	2.4	Ton / m.
Vol. of Tetrapod	V =	3.333	Cu. meter
Overall dim. of Tetrapod	H =	2.264	meter

Dimensions of Armour Units in meter

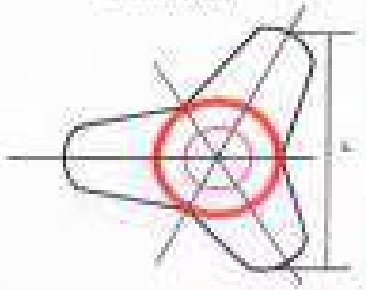
A	0.302*H	0.68
B	0.151*H	0.34
C	0.477*H	1.08
D	0.470*H	1.06
E	0.235*H	0.53
F	0.646*H	1.46
G	0.215*H	0.49
I	0.606*H	1.37
J	0.303*H	0.69
K	1.091*H	2.47
L	1.201*H	2.72



BOTTOM



ELEVATION



Armour layer Thickness (2 Units) = 1.381 * H (Double Layer)
i.e = 3.069 meter

Placing Density (N)
Number Of Tetrapods (Two Layers, Random Placed) Per Unit Area
N = n * K∆ * [1-P/100] * (w/W)^2/3
Where,

Layer coeff.	K∆ =	1.04	constant
Porosity	P=	50	%
No. of Layers	n=	2	nos.

N = 0.469 per sq. m. area
N = 47 per 100 sq. m. area

Specification for 8 t Tetrapod

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Annexure - V



Photo 1: 90 m long RSWG wave flume facility at CWPRS



Photo 2: Random wave test with H_s = 4.85 m at DWL = +2.60 m



Photo 3: Random wave test with H_s = 4.85 m at DWL = +2.60 m (Endurance Test)

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Photo 4: Random wave test with H_s = 4.0 m at MHHW = +1.40 m



Photo 5: Random wave test with H_s = 3.97 m at MSL = +1.00 m



Photo 6: Random wave test with H_s = 3.76 m at MLLW = +0.40 m

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Photo 7: Regular wave test with H_{10} = 5.0 m at DWL = +2.60 m, t = 10 sec



Photo 8: Regular wave test with H_{10} = 5.12 m at MHHW = +1.40 m, t = 12 sec



Photo 9: Regular wave test with H_{10} = 5.0 m at MHHW = +1.40 m, t = 10 sec

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Photo 10: Regular wave test with $H_{1/3}$ = 5.0 m at MHHW = +1.40 m, t = 8 sec



Photo 11: Regular wave test with $H_{1/3}$ = 5.07 m at MSL = +1.00 m, t = 10 sec



Photo 12: Regular wave test with H_s = 4.80 m at MLLW = +0.40 m, t = 10 sec

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सत्यमेव जयते

भारत सरकार / Government of India
जल शक्ति मंत्रालय / Ministry of Jal Shakti
जल संसाधन, नदी विकास और गंगा संरक्षण विभाग
Department of Water Resources, River Development and Ganga Rejuvenation
केन्द्रीय जल और विद्युत अनुसंधान शाला
खड़कवासला, पुणे - 411 024
CENTRAL WATER & POWER RESEARCH STATION
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🖷:020-24381004
🖳:www.cwprs.gov.in

संख्या/No.: CHS/2024/01/141

दिनांक/Date: 09.08.2024

The Chief Engineer
Harbour Engineering Department
Kamaleswaram, Manacaud,
Thiruvananthapuram
Kerala – 695 009

Sub: Desk & wave flume studies for the design of breakwater for fishery harbor at Ajanur in Kasargod district, Kerala.

Ref: 1) Your letter No. HECE/207/2022-DR8 dated 01.08.2024
2) Discussions at CWPRS on 30.07.2024
3) CWPRS Technical Report No. 6177, November 2023

Sir,

This has a reference to the above cited correspondence regarding the desk & wave flume studies for the design of breakwater for fishery harbor at Ajanur in Kasargod district, Kerala. A request has been made to review the Technical Report (Ref. 3) to optimize the breakwater design. The possibility of optimization of the breakwater cross-sections were discussed during your visit to CWPRS on 30.07.2024. Accordingly, desk studies have been conducted considering the project requirements, and minor modifications to the breakwater cross-sections have been carried out, as shown in Figs. 1 to 4.

The modified design cross-sections of the breakwater include a revised crest width of 5.5 m instead of 7.0 m, except for the roundhead crest width, which remains at 8.0 m. In the modified cross-section for the -2.0 m bed level, the lee side armour consists of 0.5-1.0 t stones placed on a 1:1.5 slope, with a toe-berm consisting of 0.5-1.0 t stones placed at el. +0.2 m, as shown in Fig. 1. In the modified cross-section for the -4.5 m bed level, the lee side armuor consists of 1.0-2.0 t stones placed on a 1:1.5 slope, with a toe-berm consisting of 1.0-2.0 t stones placed at el. -2.55 m, as shown in Fig. 2. Minor modifications have also been made to the toe-berm portion of the roundhead. The toe-berm consists of 3.0-4.0 t

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stones placed at el. -0.7 m, as shown in Fig. 3. The modified plan of the roundhead is shown in Fig. 4. All other details of the breakwater design cross-sections will remain the same as provided in CWPRS Technical Report No. 6177, November 2023.

Hope this would meet with your requirements.

धन्यवाद,

भवदीय,

7/8/2024

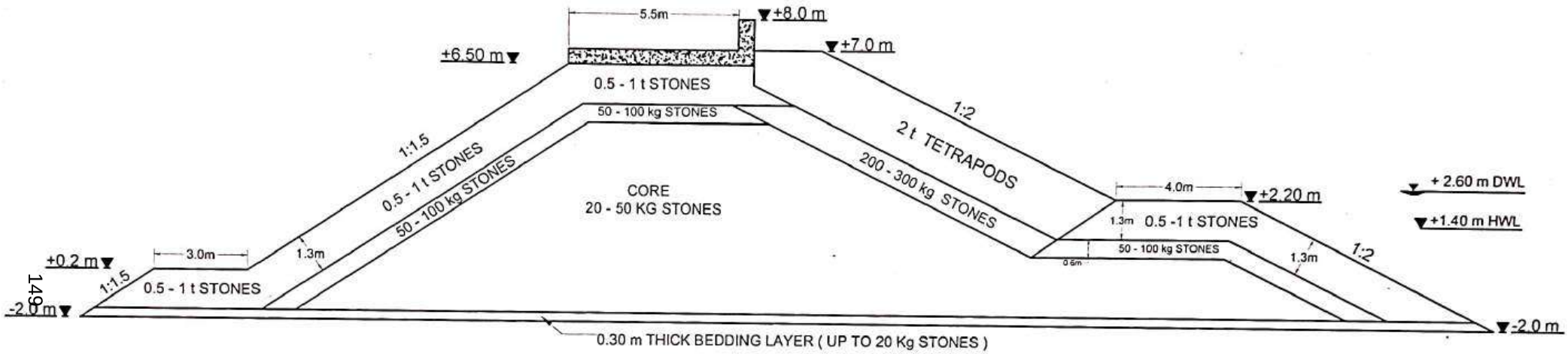
(ए वी महालिंगैया/A.V.Mahalingaiah)
वैज्ञानिक 'ई' / Scientist 'E'

"जल ही जीवन का आधार है।"

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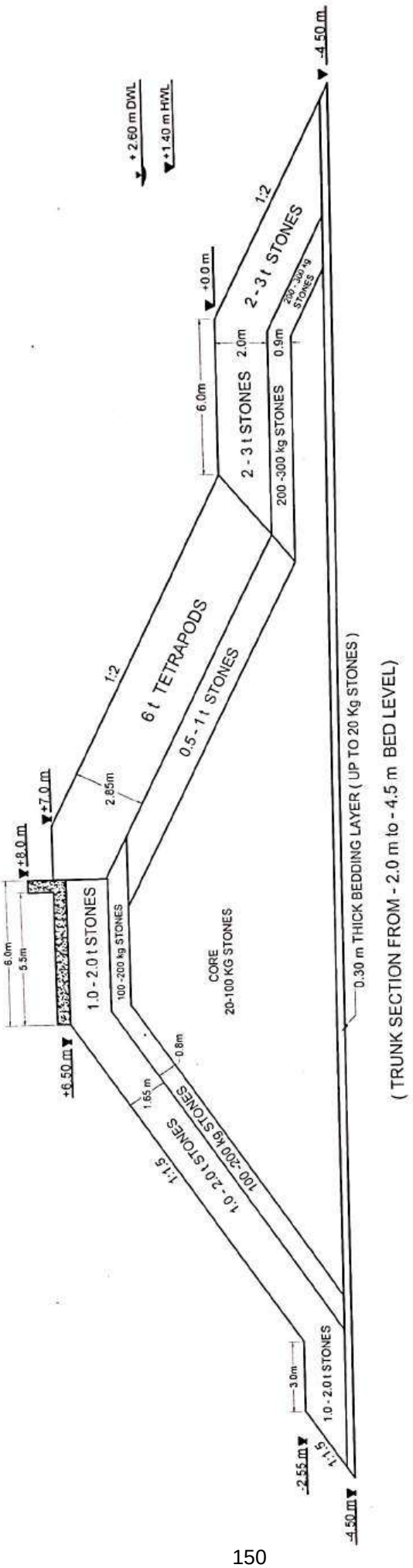
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(TRUNK SECTION FROM 0.0 m to - 2.0 m BED LEVEL)

FIG 1 :- MODIFIED DESIGN CROSS -SECTION OF BREAKWATER AT -2.0 m BED LEVEL, AJANUR, KERALA



(TRUNK SECTION FROM - 2.0 m to - 4.5 m BED LEVEL)

FIG 2:- MODIFIED DESIGN CROSS-SECTION OF BREAKWATER AT - 4.50 m BED LEVEL, AJANUR, KERALA

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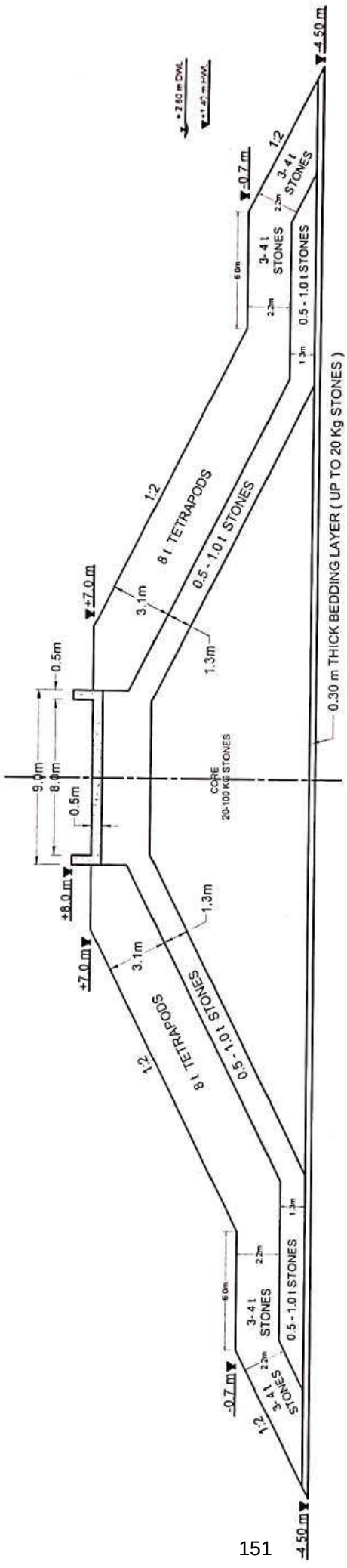


FIG 3 :- MODIFIED ROUNDHEAD CROSS-SECTION OF BREAKWATER AT -4.5 m BED LEVEL, AJANUR, KERALA

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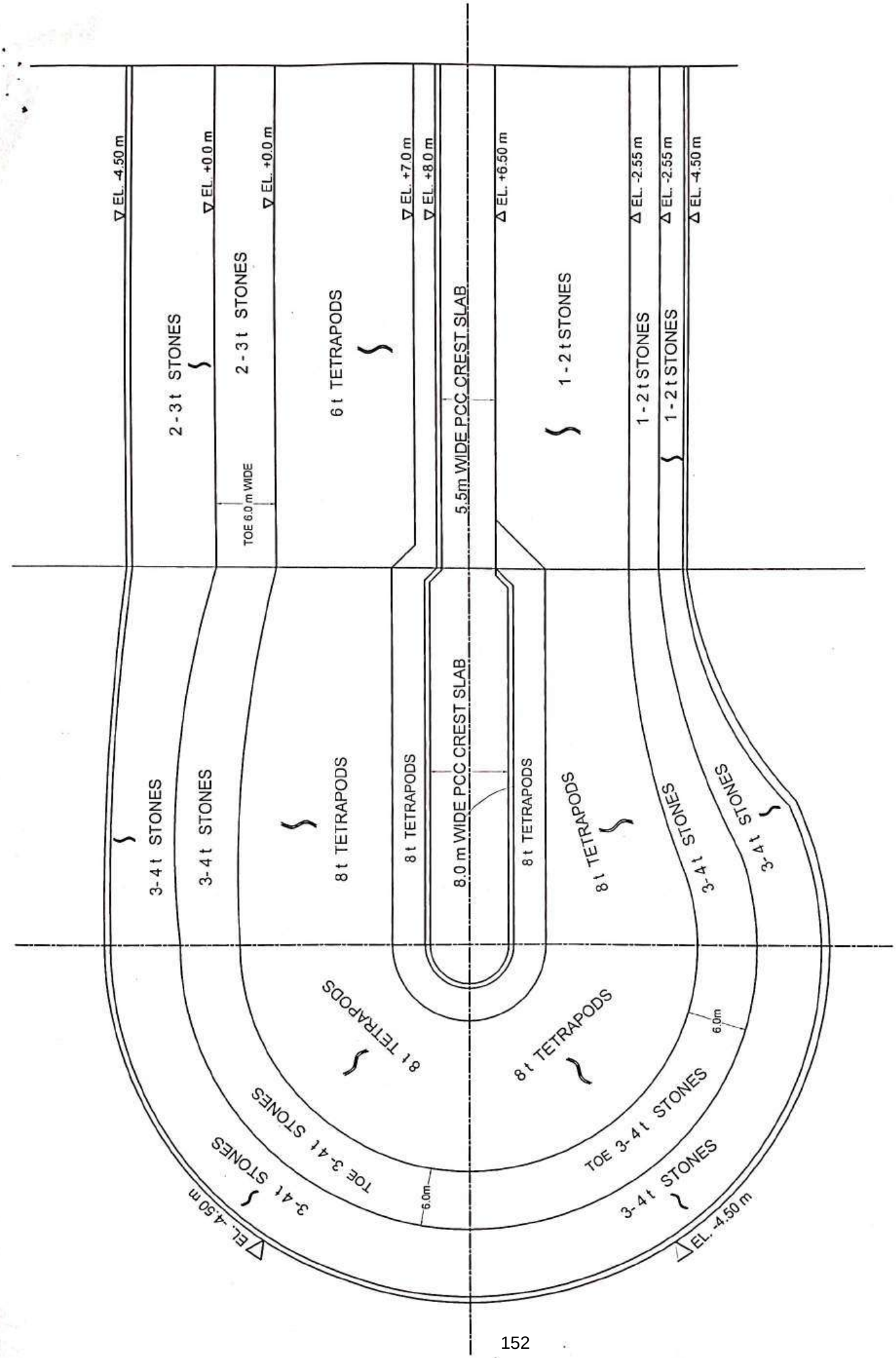


FIG 4 :- PLAN OF ROUNDHEAD SECTION OF BREAKWATER AT -4.5 m BED LEVEL, AJANUR, KERALA

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GENERAL ABSTRACT

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PMMSY - Construction of Ajanur Fishing Harbour - General Abstract				
Sl No	**Item**	**Quantity**	**Unit Rate in Rs**	**Amount in Rs**
1	Construction of Breakwater at Ajanoor	1575m	772063.5	1,21,60,00,000
2	Construction of river training wall and and dredging near the river training area	training wall-435m dredging- 31000 m3		32,60,00,000
3	Dredging And Construction of reclamation Bund	dredging - 132500 m3 reclamation bund- 400 m		6,24,00,000
4	Wharf and Auction Hall	Wharf - 120 m x 6.6 m , Auction Hall - 60 m x 15 m Total 1692m3	34929.1	5,91,00,000
5	Canteen, Rest shed, Locker room, Gear Shed	45 m x 10 m (two Storey)	27666.7	2,49,00,000
6	Compound wall and Side Protection Works	compound wall- 510 m side protection- 1710 m		6,14,00,000
7	Gate and Gate House	2.4 m x 2.4 m ATM and Toll Booth each (area 47.16m2)	38167.9	18,00,000
7	Internal Road, Parking area and Drainage facility	Parking Area - 4320 sqm	3873.6	2,82,00,000
		Internal Road - 740*4 m		
8	Toilet Block	13.3*5	37594.0	25,00,000
9	Construction of approach road to fishing harbour	950 m	14526.3	1,38,00,000
10	Construction of workshop building	9.8*9.8 m	48521.4	46,80,000
11	Construction of office room cum harbour surveillance camera room	14.6*22.6 m (2 storey)	26851.7	89,00,000
12	Construction of wharf for berthing facility	100*5 m	42800.0	2,14,00,000
15	OH Tank and Water Supply Arrangement	As per estimate		1,89,00,000
14	Effluent Treatment Plant	LS		35,00,000
17	Navigational Facility	LS		2,00,000
18	Pressure Washer and Cleaning equipments	LS		6,00,000
19	Landscaping, Green Belt and Rainwater Harvesting	LS		20,00,000
24	Mechanical conveyor system & Automation	LS		1,50,00,000
23	Electrification and Installation of Solar energy system	LS		2,50,00,000
			Total (A)	**1,89,62,80,000**

File No. HECE/207/2022-DR8 (Computer No. 19397)

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Smart Infrastructure and automated systems			
30	Smart Technology Investments		
30.1	Procurement and installation of smart infrastructure components, such as IoT devices, sensors, communication networks, and data management systems including cost of hardware, software, and installation services.	LS	1,00,00,000
30.2	Development or customization of software for data management, analysis and visualization	LS	50,00,000
31	Communication and Connectivity		
31.1	Deployment of communication infrastructure, including internet connectivity, satellite communication systems, and wireless networks	LS	50,00,000
31.2	Implementation of networking equipment and cybersecurity measures	LS	50,00,000
32	Safety and Security Measures		
32.1	Investment in safety equipment (distress beacons and rescue drones)	LS	50,00,000
32.2	Installation of surveillance system including CCTV camera	LS	50,00,000
35	Provide charging stations for electric vehicles	L.S	10,00,000
36	Vehilce for installing IOT devices	L.S	35,00,000
		Sub total	**3,95,00,000**
		GST @ 18%	**71,10,000**
		Sub Total including GST @ 18% (B)	**4,66,10,000**
		Sub Total (C= A+B)	**1,94,28,90,000**
		Contingencies @ 3%	**5,71,10,000**
		Grand Total	**2,00,00,00,000**
Rupees Two hundred crore only			

File No. HECE/207/2022-DR8 (Computer No. 19397)

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ESTIMATES

File No. HECE/207/2022-DR8 (Computer No. 19397)

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EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of Breakwater-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Appendix A- North Breakwater- 1150m**			
1.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	8500.000cum	@210.02/cum	1785170.00
1.002	OD7023/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	33200.000tonne	@935.64/tonne	31063248.00
1.003	OD4410/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	27300.000tonne	@935.64/tonne	25542972.00

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(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
1.004	OD4413/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20kg to 100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	237600.000tonne	@935.64/tonne	222308064.00
1.005	OD7021/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	47400.089tonne	@935.64/tonne	44349419.27
1.006	OD7020/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	9500.018tonne	@935.64/tonne	8888596.84
1.007	OD7018/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	22600.043tonne	@1093.96/tonne	24723543.04
1.008	OD7017/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 0.5-1T and above category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	49000.087tonne	@1077.91/tonne	52817683.78
1.009	OD235/2022-2023			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1 T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings			

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site			
	Net Total	69100.130tonne	@1077.91/tonne	74483721.13
1.010	OD7158/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T - 3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	51000.088tonne	@1077.91/tonne	54973504.86
1.011	65.103			
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .			
	Net Total	3100.000each	@7537.42/each	23366002.00
1.012	65.104			
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site			
	Net Total	3100.000each	@909.34/each	2818954.00
1.013	OD7266/2023-2024			
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate			

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer			
	Net Total	7500.000each	@22383.48/each	167876100.00
1.014	OD7610/2023-2024			
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete			
	Net Total	7500.000each	@1556.05/each	11670375.00
1.015	65.124			
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.			
	Net Total	370.000each	@29749.73/each	11007400.10
1.016	65.125			
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete			
	Net Total	370.000each	@2214.51/each	819368.70
			Heading Total(Rs)	758494122.72
2	**Appendix B - Southern Breakwater- 425m**			
2.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	4300.000cum	@210.02/cum	903086.00

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(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
2.002	OD7147/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	12500.000tonne	@935.64/tonne	11695500.00
2.003	OD7146/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	45100.000tonne	@935.64/tonne	42197364.00
2.004	OD7145/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			

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(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	56000.000tonne	@935.64/tonne	52395840.00
2.005	OD7144/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	9000.000tonne	@935.64/tonne	8420760.00
2.006	OD7143/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10 kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	6500.000tonne	@935.64/tonne	6081660.00
2.007	OD7142/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once			

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Sl No	Specification	Quantity	Rate	Amount
	in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	8600.000tonne	@1093.96/tonne	9408056.00
2.008	OD7141/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 500 Kg -1T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	26600.000tonne	@1077.91/tonne	28672406.00
2.009	OD241/2022-2023			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site			
	Net Total	16400.000tonne	@1077.91/tonne	17677724.00
2.010	OD7159/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T-3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with			

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(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	15300.000tonne	@1077.91/tonne	16492023.00
2.011	65.103			
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .			
	Net Total	2950.000each	@7537.42/each	22235389.00
2.012	65.104			
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site			
	Net Total	2950.000each	@909.34/each	2682553.00
2.013	OD7279/2023-2024			
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer			
	Net Total	1750.000each	@22383.48/each	39171090.00
2.014	OD7611/2023-2024			
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc			

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	complete			
	Net Total	1750.000each	@1556.05/each	2723087.50
2.015	65.124			
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.			
	Net Total	350.000each	@29749.73/each	10412405.50
2.016	65.125			
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete			
	Net Total	350.000each	@2214.51/each	775078.50
	Heading Total(Rs)			271944022.50
	Total Estimation PAC			1030438145.22
4	**Extra Charges**			
3.001	Provision for GST			
	1030438145.22		18.00%	185478866.14
	Grand Total			1215917011.36
	Round off			82988.64
	Rounded Total(Rs)			1216000000.00
	Rupees One Hundred Twenty One Crore Sixty Lakh			

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of Breakwater-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Appendix A- North Breakwater- 1150m						
1.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	Break water on the land connection area						
		1.000	100.000	50.000	(1.2+2.2)/2		8500.000
	Total						**8500.000**
						Total Quantity in cum	**8500.000**
1.002	OD7023/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	Upto 20kg stones						
	Ch 0 to 210	1.000	210.000	(13.84+14.89)/2	(2/3)*2.65		5329.425
	Ch 210 to 1150	1.000	940.000	(15.24+16.81)/2	(2/3)*2.65		26612.234
	Head portion as per calculation sheet	1.000	628.540		(2/3)*2.65		1110.423
	Rounding	1.000	147.918				147.918
	Total						**33200.000**
						Total Quantity in tonne	**33200.000**

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(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.003	OD4410/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	10 to 200 Kg stones						
	Ch 210 to 1150	1.000	940.000	(15.26+17.42)/2	2/3*2.65		27135.345
	Rounding	1.000	164.655				164.655
	Total						**27300.000**
						Total Quantity in tonne	**27300.000**
1.004	OD4413/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20kg to 100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20 to 100 Kg stones						
	Ch 210 to 1150	1.000	940.000	(117.95+163.28)/2	2/3*2.65		233515.084
	Head portion as per calculation sheet	1.000	2198.950		2/3*2.65		3884.819
	Rounding	1.000	200.097				200.097
	Total						**237600.000**

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in tonne	**237600.000**
1.005	OD7021/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20-50kg stones						
	Ch 0 to 210	1.000	210.000	(112.86+141.63)/2	(2/3)*2.65		47207.984
	Rounding	1.000	192.105				192.105
	Total						**47400.089**
						Total Quantity in tonne	**47400.089**
1.006	OD7020/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	50-100kg stones						
	Ch 0 to 210	1.000	210.000	(24.19+25.99)/2	(2/3)*2.65		9308.408
	Rounding	1.000	191.610				191.610
	Total						**9500.018**
						Total Quantity in tonne	**9500.018**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.007	OD7018/2023-2024						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	200- 300kg stones						
	Ch 0 to 210	1.000	210.000	(10.29+12.52)/2	(2/3)*2.65		4231.263
	Ch 210 to 1150	1.000	940.000	(11.03+11.03)/2	(2/3)*2.65		18317.188
	Rounding	1.000	51.592				51.592
	Total						**22600.043**
						Total Quantity in tonne	**22600.043**
1.008	OD7017/2023-2024						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 0.5-1T and above category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	500 Kg to 1T Stones						
	Ch 0 to 210	1.000	210.000	(47.5+49.84)/2	(2/3)*2.65		18056.604

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Ch 210 to 1150	1.000	940.000	(14.45+18.89)/2	(2/3)*2.65		27683.366
	Head portion as per calculation sheet	1.000	1790.050		(2/3)*2.65		3162.428
	Rounding	1.000	97.689				97.689
	Total						**49000.087**
						Total Quantity in tonne	**49000.087**
1.009	OD235/2022-2023						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1 T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site						
	1T to 2T Stones						
	Ch 210 to 1150	1.000	940.000	(39.35+43.81)/2	(2/3)*2.65		69050.650
	Rounding	1.000	49.480				49.480
	Total						**69100.130**
						Total Quantity in tonne	**69100.130**
1.010	OD7158/2023-2024						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T - 3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	2T - 3T Stones						
	Ch 300 to 1150	1.000	940.000	(28.21+28.21)/2	(2/3)*2.65		46847.495
	Head portion as per calculation sheet	1.000	2294.810		(2/3)*2.65		4054.172
	Rounding	1.000	98.421				98.421
	Total						**51000.088**
						Total Quantity in tonne	**51000.088**
1.011	65.103						
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .						
	Moulding & supplying 2T						
	Ch 0 to 210	1.000	210.000	(11.07+13.3)/2		1.196000	3060.385
	Rounding	1.000	39.615	1.000	1.000	1.000000	39.615
	Total						**3100.000**
						Total Quantity in each	**3100.000**
1.012	65.104						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site						
	Conveying 2T tetrapod						
	Quantity as per item 11	1.000	3100.000				3100.000
	Total						**3100.000**
						Total Quantity in each	**3100.000**
1.013	OD7266/2023-2024						
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer						
	Moulding & supplying 6 T						
	Ch 210 to 1150	1.000	940.000	(12+15.31)/2		0.580000	7444.706
	Rounding	1.000	55.294			1.000000	55.294
	Total						**7500.000**
						Total Quantity in each	**7500.000**
1.014	OD7610/2023-2024						
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	Conveying 6T tetrapod						
	Quantity as per item 13	1.000	7500.000				7500.000
	Total						**7500.000**
						Total Quantity in each	**7500.000**
1.015	65.124						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.						
	Moulding & Supplying 8T Tetrapods						
	Round head	1.000	3.14*12.9	18.780		0.480000	365.137
	Rounding	1.000	4.863				4.863
	Total						**370.000**
						Total Quantity in each	**370.000**
1.016	65.125						
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	Conveying 8T tetrapod						
	Quantity as per item 15	1.000	370.000				370.000
	Total						**370.000**
						Total Quantity in each	**370.000**
2	Appendix B - Southern Breakwater- 425m						
2.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	Break water on the land connection area						
		1.000	50.000	50.000	(1.2+2.2)/2		4250.000
	rounding	1.000	50.000				50.000
	Total						**4300.000**
						Total Quantity in cum	**4300.000**
2.002	OD7147/2023-2024						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	Up to 20 Kg stones						
	Ch 0 to 200	1.000	200.000	(13.84+14.89)/2	(2/3)*2.65		5075.643
	Ch 200 to 425	1.000	225.000	(15.24+16.29)/2	(2/3)*2.65		6266.599
	Head portion as per calculation sheet	1.000	594.600		(2/3)*2.65		1050.462
	Rounding	1.000	107.296	1.000	1.000		107.296
	Total						**12500.000**
						Total Quantity in tonne	**12500.000**
2.003	OD7146/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20 Kg - 50 Kg stones						
	Ch 0 to 200	1.000	200.000	(112.86+141.63)/2	(2/3)*2.65		44959.985
	rounding	1.000	140.015	1.000	1.000		140.015

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(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**45100.000**
						Total Quantity in tonne	**45100.000**
2.004	OD7145/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20-100kg stones						
	Ch 200 to 425	1.000	225.000	(117.95+146.87)/2	(2/3)*2.65		52633.074
	head portion as per calculation	1.000	1888.330		(2/3)*2.65		3336.056
	rounding	1.000	30.870				30.870
	Total						**56000.000**
						Total Quantity in tonne	**56000.000**
2.005	OD7144/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	50Kg - 100kg stones						
	Ch 0 to 200	1.000	200.000	(24.19+25.99)/2	(2/3)*2.65		8865.150

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	134.850				134.850
	Total						**9000.000**
						Total Quantity in tonne	**9000.000**
2.006	OD7143/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10 kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	100-200kg stones						
	Ch 200 to 425	1.000	225.000	(15.26+16.7)/2	(2/3)*2.65		6352.062
	Rounding	1.000	147.938				147.938
	Total						**6500.000**
						Total Quantity in tonne	**6500.000**
2.007	OD7142/2023-2024						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	200Kg - 300 Kg stones						
	Ch 0 to 200	1.000	200.000	(10.29+12.52)/2	(2/3)*2.65		4029.774
	Ch 200 to 425	1.000	225.000	(11.03+11.03)/2	(2/3)*2.65		4384.433

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	185.793				185.793
	Total						**8600.000**
						Total Quantity in tonne	**8600.000**
2.008	OD7141/2023-2024						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 500 Kg -1T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	500 Kg -1T Stones						
	Ch 0 to 200	1.000	200.000	(47.5+49.84)/2	(2/3)*2.65		17196.766
	Ch 200 to 425	1.000	225.000	(14.45+17.44)/2	(2/3)*2.65		6338.149
	head portion as per calculation	1.000	1667.380		(2/3)*2.65		2945.710
	rounding	1.000	119.375				119.375
	Total						**26600.000**
						Total Quantity in tonne	**26600.000**
2.009	OD241/2022-2023						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site						

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	1T-2T Stones						
	Ch 200 to 425	1.000	225.000	(39.35+42.32)/2	(2/3)*2.65		16231.943
	Rounding	1.000	168.057				168.057
	Total						**16400.000**
						Total Quantity in tonne	**16400.000**
2.010	OD7159/2023-2024						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T-3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	2-3T Stones						
	Ch 200 to 425	1.000	225.000	(28.21+28.21)/2	(2/3)*2.65		11213.496
	Head portion as per calculation sheet	1.000	2213.980		(2/3)*2.65		3911.372
	rounding	1.000	175.132				175.132
	Total						**15300.000**
						Total Quantity in tonne	**15300.000**
2.011	65.103						
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .						

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Moulding & supplying 2T						
	Ch 0 to 200	1.000	200.000	(11.07+13.3)/2		1.196000	2914.652
	Rounding	1.000	35.348	1.000		1.000000	35.348
	Total						**2950.000**
						Total Quantity in each	**2950.000**
2.012	65.104						
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site						
	Conveying 2T tetrapod						
	Quantity as per item 11	1.000	2950.000				2950.000
	Total						**2950.000**
						Total Quantity in each	**2950.000**
2.013	OD7279/2023-2024						
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer						
	Moulding & supplying 6T						
	Ch 200 to 425	1.000	225.000	(12+14.2)/2		0.580000	1709.550
	Ch 350 to 435	1.000	40.450				40.450
	Total						**1750.000**
						Total Quantity in each	**1750.000**
2.014	OD7611/2023-2024						
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	conveying 6T tetrapod						
	Quantity as per item 13	1.000	1750.000				1750.000
	Total						**1750.000**
						Total Quantity in each	**1750.000**

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EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
2.015	65.124						
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.						
	Moulding & supplying 8T						
	Round head	1.000	3.14*12.4	17.660		0.480000	330.053
	rounding	1.000	19.947	1.000	1.000	1.000000	19.947
	Total						**350.000**
						Total Quantity in each	**350.000**
2.016	65.125						
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	conveying 8T tetrapod						
	Quantity as per item 15	1.000	350.000				350.000
	Total						**350.000**
						Total Quantity in each	**350.000**

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of River training work and Dredging near the river training area-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Appendix A -River training work-435m**			
1.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	4250.000cum	@210.02/cum	892585.00
1.002	OD5423/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	12550.022tonne	@935.64/tonne	11742302.58
1.003	OD5426/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	58500.110tonne	@935.64/tonne	54735042.92

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(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
1.004	OD5425/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20kg to 100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	44300.078tonne	@935.64/tonne	41448924.98
1.005	OD5427/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	11600.022tonne	@935.64/tonne	10853444.58
1.006	OD5428/2024-2025			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges			

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	8700.017tonne	@1093.96/tonne	9517470.60
1.007	OD5424/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	5000.000tonne	@935.64/tonne	4678200.00
1.008	OD5429/2024-2025			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 0.5-1T and above category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	30300.052tonne	@1077.91/tonne	32660729.05
1.009	OD5430/2024-2025			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1 T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings			

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site			
	Net Total	12700.024tonne	@1077.91/tonne	13689482.87
1.010	OD5431/2024-2025			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T - 3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	12700.016tonne	@1077.91/tonne	13689474.25
1.011	65.103			
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .			
	Net Total	3800.000each	@7537.42/each	28642196.00
1.012	65.104			
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site			
	Net Total	3800.000each	@909.34/each	3455492.00
1.013	OD5432/2024-2025			
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate			

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer			
	Net Total	1350.000each	@22383.48/each	30217698.00
1.014	OD5433/2024-2025			
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete			
	Net Total	1350.000each	@1556.05/each	2100667.50
1.015	65.124			
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.			
	Net Total	350.000each	@29749.73/each	10412405.50
1.016	65.125			
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete			
	Net Total	350.000each	@2214.51/each	775078.50
	Heading Total(Rs)			269511194.33
2	**Appendix B- Dredging near river training area**			
2.001	65.82			
	Deepening the harbour basin and mouth by using dredger having a flow rate of 700 to 1000m3 slurry per hour with a solid output of not less than 127.5 m3/hour and dumping the spoil at location already pointed out by the departmental officers with a lead up to a radial distance of 500m, including hire charges of dredger, all tools and plants and accesories , fuel charges, idling and mobilisation charges, providing and shifting the pipe lines including all labour charges, incidental charges etc. and drtvice			

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Sl No	Specification	Quantity	Rate	Amount
	taxes complete for a depth upto (-) 4.50m bedlevel with a tolerance of +/- 20cm. Unexpected Error occured Please Login again!! Click here to Login			
	Net Total	31000.000cum	@182.57/cum	5659670.00
			Heading Total(Rs)	5659670.00
			Total Estimation PAC	275170864.33
Sl No	**Description**		**Percentage/LS**	**Amount**
3	**Lumsum Heading**			
3.001	LS provision for part TS			
		null	null%	500000.00
			Total Lumsum Amount	500000.00
4	**Extra Charges**			
3.001	Provision for GST			
		275170864.33	18.00%	49530755.58
			Grand Total	325201619.91
			Round off	798380.09
			Rounded Total(Rs)	326000000.00
	Rupees Thirty Two Crore Sixty Lakh			

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of River training work and Dredging near the river training area-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Appendix A -River training work-435m						
1.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	River Training work						
		1.000	50.000	50.000	(1.2+2.2)/2		4250.000
	Total						**4250.000**
						Total Quantity in cum	**4250.000**
1.002	OD5423/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	Upto 20 kg stones						
	Ch 0 to 260	1.000	260.000	(13.84+14.89)/2	2/3*2.65		6598.336
	Ch 260 to 435	1.000	175.000	(15.24+16.29)/2	2/3*2.65		4874.022
	Head As per calculation sheet	1.000	594.600		2/3*2.65		1050.462
	Rounding	1.000	27.202				27.202
	Total						**12550.022**
						Total Quantity in tonne	**12550.022**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.003	OD5426/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20 - 50 kg stones						
	Ch 0 to 260	1.000	260.000	(112.86+ 141.63)/2	2/3*2.65		58447.980
	Rounding	1.000	52.130				52.130
	Total						**58500.110**
						Total Quantity in tonne	**58500.110**
1.004	OD5425/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20kg to 100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20 to 100 Kg Stones						
	Ch 260 to 435	1.000	175.000	(117.95+ 146.87)/2	2/3*2.65		40936.836
	Head portion as per calculation sheet	1.000	1888.330		2/3*2.65		3336.056
	Rounding	1.000	27.186				27.186
	Total						**44300.078**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in tonne	**44300.078**
1.005	OD5427/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	50 to 100 Kg						
	Ch 0 to 260	1.000	260.000	(24.19+25.99)/2	2/3*2.65		11524.695
	Rounding	1.000	75.327				75.327
	Total						**11600.022**
						Total Quantity in tonne	**11600.022**
1.006	OD5428/2024-2025						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	200 to 300 Kg stones						
	Ch 0 to 260	1.000	260.000	(10.29+12.52)/2	2/3*2.65		5238.707
	Ch 260 to 435	1.000	175.000	(11.03+11.03)/2	2/3*2.65		3410.115

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Rounding	1.000	51.195				51.195
	Total						**8700.017**
						Total Quantity in tonne	**8700.017**
1.007	OD5424/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	10- 200 kg Stone						
	Ch 260 to 435	1.000	175.000	(15.26+16.7)/2	2/3*2.65		4940.493
	Rounding	1.000	59.507				59.507
	Total						**5000.000**
						Total Quantity in tonne	**5000.000**
1.008	OD5429/2024-2025						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 0.5-1T and above category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	500 to 1 T						
	Ch 0 to 260	1.000	260.000	(47.5+49.84)/2	2/3*2.65		22355.796
	Ch 260 to 435	1.000	175.000	(14.45+17.44)/2	2/3*2.65		4929.672

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Head As per calculation sheet	1.000	1667.380		2/3*2.65		2945.710
	Rounding	1.000	68.874				68.874
	Total						**30300.052**
						Total Quantity in tonne	**30300.052**
1.009	OD5430/2024-2025						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1 T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site						
	1 T to 2 T						
	Ch 260 to 435	1.000	175.000	(39.35+42.32)/2	2/3*2.65		12624.845
	Rounding	1.000	75.179				75.179
	Total						**12700.024**
						Total Quantity in tonne	**12700.024**
1.010	OD5431/2024-2025						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T - 3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	2 T to 3 T						
	Ch 260 to 435	1.000	175.000	(28.21+28.21)/2	2/3*2.65		8721.608
	Head as per calculation sheet	1.000	2213.980		2/3*2.65		3911.372
	Rounding	1.000	67.036				67.036
	Total						**12700.016**
						Total Quantity in tonne	**12700.016**
1.011	65.103						
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .						
	Moulding & Supplying 2T						
	Ch 0 to 260	1.000	260.000	(11.07+13.3)/2		1.196000	3789.048
	Rounding	1.000	10.952				10.952
	Total						**3800.000**
						Total Quantity in each	**3800.000**
1.012	65.104						
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site						
	Conveying 2T tetrapod						
	Quantity as per item 11	1.000	3800.000				3800.000
	Total						**3800.000**
						Total Quantity in each	**3800.000**
1.013	OD5432/2024-2025						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer						
	Moulding & supplying 6 T						
	Ch 260 to 435	1.000	175.000	(12+14.2) /2		0.580000	1329.650
	Rounding	1.000	20.350				20.350
	Total						**1350.000**
						Total Quantity in each	**1350.000**
1.014	OD5433/2024-2025						
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	Conveying 6T tetrapod						
	Quantity as per item 13	1.000	1350.000				1350.000
	Total						**1350.000**
						Total Quantity in each	**1350.000**
1.015	65.124						
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.						
	Moulding & Supplying 8T Tetrapods						
	Round Head	1.000	3.14*12.4	17.660		0.480000	330.053
	Rounding	1.000	19.947				19.947
	Total						**350.000**
						Total Quantity in each	**350.000**
1.016	65.125						

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	Conveying 8T tetrapod						
	Quantity as per item 15	1.000	350.000				350.000
	Total						**350.000**
						Total Quantity in each	**350.000**
2	Appendix B- Dredging near river training area						
2.001	65.82						
	Deepening the harbour basin and mouth by using dredger having a flow rate of 700 to 1000m3 slurry per hour with a solid output of not less than 127.5 m3/hour and dumping the spoil at location already pointed out by the departmental officers with a lead up to a radial distance of 500m, including hire charges of dredger, all tools and plants and accesories , fuel charges, idling and mobilisation charges, providing and shifting the pipe lines including all labour charges, incidental charges etc. and drtvice taxes complete for a depth upto (-) 4.50m bedlevel with a tolerance of +/- 20cm. Unexpected Error occured Please Login again!! Click here to Login						
	Deepening and Dredging						
	Area between 0 and -1	1.000	7745.080		(3+2)/2		19362.700
	Area between -1 and -2	1.000	5106.141		(2+1)/2		7659.212
	Area between -2 and -3	1.000	7871.094		(1+0)/2		3935.547
	Rounding	1.000	42.541				42.541
	Total						**31000.000**
						Total Quantity in cum	**31000.000**

EST No. :HED/CEHED/EST/105/2022_5_2_1 (Edit Id : 13)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Dredging And Construction of reclamation Bund-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Dredging**			
1.001	60.7.1			
	DRY RUBBLE MASONRY _ Dry rubble without concrete levelling course masonry with good quality blasted rubble including packing to compactness to lines and levels cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site			
	Net Total	5720.000cum	@3426.06/cum	19597063.20
1.002	OD204/2022-2023			
	Supplying and laying Geotextile (120 grams per sqm membrane) in two layers including joints by stitching, over lapping etc. over sand bag to the land side of the bund including all cost of materials and labour charges etc. complete as per the directions of the departmental officers at site.			
	Net Total	2200.000sqm	@85.11/sqm	187242.00
1.003	65.82			
	Deepening the harbour basin and mouth by using dredger having a flow rate of 700 to 1000m3 slurry per hour with a solid output of not less than 127.5 m3/hour and dumping the spoil at location already pointed out by the departmental officers with a lead up to a radial distance of 500m, including hire charges of dredger, all tools and plants and accesories , fuel charges, idling and mobilisation charges, providing and shifting the pipe lines including all labour charges, incidental charges etc. and drtvice taxes complete for a depth upto (-) 4.50m bedlevel with a tolerance of +/- 20cm. Unexpected Error occured Please Login again!! Click here to Login			
	Net Total	132500.000cum	@182.57/cum	24190525.00
1.004	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	55.526cum	@9237.20/cum	512904.77
1.005	OD5553/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR			

EST No. :HED/CEHED/EST/105/2022_5_2_1 (Edit Id : 13)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	4159.320kilogram	@96.62/kilogram	401873.50
			Heading Total(Rs)	44889608.47
2	**Reclamation bund**			
2.001	11.1.5			
	Excavation for Structures Earthwork in excavation for structures as per drawing and technical specifications Clause 305.1 including setting out, construction of shoring and bracing, removal of stumps and other deleterious material and disposal upto a lead of 50 m, dressing of sides and bottom and backfilling in trenches with excavated suitable material. V. Marshy soil			
	Net Total	4800.000cum	@1407.08/cum	6753984.00
2.002	12.11			
	Providing and laying filter media with granular crushed aggregates as per specification to a thickness of not less than 600 mm with smaller size towards the soil and bigger size towards the wall and providing over the entire surface behind abutment, wing wall, return wall to the full height, compacted to firm condition complete as per drawing and technical specification Clause 1204.3.8			
	Net Total	360.000cum	@3435.35/cum	1236726.00
			Heading Total(Rs)	7990710.00
			Total Estimation PAC	52880318.47
4	**Extra Charges**			
3.001	Provision for GST			
	52880318.47		18.00%	9518457.32
			Grand Total	62398775.79
			Round off	1224.21
			Rounded Total(Rs)	62400000.00
	Rupees Six Crore Twenty Four Lakh			

EST No. :HED/CEHED/EST/105/2022_5_2_1 (Edit Id : 13)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Dredging And Construction of reclamation Bund-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Dredging						
1.001	60.7.1						
	DRY RUBBLE MASONRY _ Dry rubble without concrete levelling course masonry with good quality blasted rubble including packing to compactness to lines and levels cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site						
	DR						
	protection wall along the basin	1.000	400.000	(4+1.2)/2	5.500		5720.000
	Total						**5720.000**
						Total Quantity in cum	**5720.000**
1.002	OD204/2022-2023						
	Supplying and laying Geotextile (120 grams per sqm membrane) in two layers including joints by stitching, over lapping etc. over sand bag to the land side of the bund including all cost of materials and labour charges etc. complete as per the directions of the departmental officers at site.						
	geotextile						
	protection wall along the basin	1.000	400.000		5.500		2200.000
	Total						**2200.000**
						Total Quantity in sqm	**2200.000**
1.003	65.82						
	Deepening the harbour basin and mouth by using dredger having a flow rate of 700 to 1000m3 slurry per hour with a solid output of not less than 127.5 m3/hour and dumping the spoil at location already pointed out by the departmental officers with a lead up to a radial distance of 500m, including hire charges of dredger, all tools and plants and accesories , fuel charges, idling and mobilisation charges, providing and shifting the pipe lines including all labour charges, incidental charges etc. and drtvice taxes complete for a depth upto (-) 4.50m bedlevel with a tolerance of +/- 20cm. Unexpected Error occured Please Login again!! Click here to Login						
	Deepening and Dredging						
	Area between 0 and -1	1.000	30265.610		(3+2)/2		75664.025
	Area between -1 and -2	1.000	25704.216		(2+1)/2		38556.324
	Area between -2 and -3	1.000	36368.372		(1+0)/2		18184.186

EST No. :HED/CEHED/EST/105/2022_5_2_1 (Edit Id : 13)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Rounding	1.000	95.465				95.465
	Total						**132500.000**
						Total Quantity in cum	**132500.000**
1.004	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	belt and guard stone works						
	rcc belt along basin	1.000	400.000	1.150	0.100		46.000
	guard stones along basin; 2m c/c	201.000	0.200	0.200	0.600	1.000000	4.824
	Rounding	4.702	1.000	1.000	1.000	1.000000	4.702
	Total						**55.526**
						Total Quantity in cum	**55.526**
1.005	OD5553/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR						
	Steel						
	rcc belt along basin	1.000	400.000	1.150	0.100	80.000000	3680.000
	guard stones along basin; 2m c/c	201.000	0.200	0.200	0.600	80.000000	385.920
	Rounding	0.934	1.000	1.000	1.000	100.000000	93.400
	Total						**4159.320**
						Total Quantity in kilogram	**4159.320**
2	Reclamation bund						
2.001	11.1.5						

EST No. :HED/CEHED/EST/105/2022_5_2_1 (Edit Id : 13)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Excavation for Structures Earthwork in excavation for structures as per drawing and technical specifications Clause 305.1 including setting out, construction of shoring and bracing, removal of stumps and other deleterious material and disposal upto a lead of 50 m, dressing of sides and bottom and backfilling in trenches with excavated suitable material. V. Marshy soil						
	Reclamation						
	protection wall along the Basin	1.000	400.000	4.000	3.000		4800.000
	Total						**4800.000**
						Total Quantity in cum	**4800.000**
2.002	12.11						
	Providing and laying filter media with granular crushed aggregates as per specification to a thickness of not less than 600 mm with smaller size towards the soil and bigger size towards the wall and providing over the entire surface behind abutment, wing wall, return wall to the full height, compacted to firm condition complete as per drawing and technical specification Clause 1204.3.8						
	for the filter media having 6mm and 20 mm broken stones						
	along basin	1.000	400.000	0.150	6.000		360.000
	Total						**360.000**
						Total Quantity in cum	**360.000**

ePLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

EST No. :HED/CEHED/EST/105/2022_5_4_4 (Edit Id : 8)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in kasaragod District -Construction of Wharf and Auction Hall-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Auction hall and wharf**			
1.001	12.22			
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.			
	Net Total	49.000MT	@120610.74/MT	5909926.26
1.002	12.23.3			
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm			
	Net Total	1969.200metre	@6921.99/metre	13630782.71
1.003	OD216/2022-2023			
	Providing and fixing reinforcement using High Corrosion Resistant (HCR) for the RCC works for superstructure including conveying, straightening, cutting, bending and tying in position etc. complete as per drawings, detailed specifications and directions of the Engineer-in-charge.			
	Net Total	184.211MT	@97850.12/MT	18025068.46
1.004	14.1.C.1			
	Furnishing and Placing Reinforced Cement Concrete Grade M30 Using Concrete Mixer in super-structure as per drawing and Technical Specification			
	Net Total	720.000cum	@8928.54/cum	6428548.80
			Heading Total(Rs)	43994326.23
2	**Auction hall- beams and slabs**			
2.001	10.22			
	Welding by gas or electric plant including transportation of plant at site etc. complete.			
	Net Total	80500.000cm	@3.90/cm	313950.00
2.002	OD220/2022-2023			
	Extra for addition of synthetic polyester triangular fibre of length 12 mm, effective diameter 10-40 microns and specific gravity of 1.34 to 1.40 in cement concrete/RCC/ Flooring / water retaining structures by using 125 gms of synthetic polyester triangular fibre for 50 kgs cement used as per directions of Engineer -in- Charge based on 4.18			
	Net Total	300.000kg	@564.07/kg	169221.00

EST No. :HED/CEHED/EST/105/2022_5_4_4 (Edit Id : 8)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
2.003	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	1050.000sqm	@800.47/sqm	840493.50
2.004	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	540.000sqm	@637.63/sqm	344320.20
2.005	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	290.000sqm	@847.44/sqm	245757.60
2.006	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	1955.000sqm	@262.57/sqm	513324.35
2.007	13.7.1			
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	1005.000sqm	@393.71/sqm	395678.55
2.008	OD1854/2022-2023			
	Providing and fixing Ist quality ceramic glazed wall tiles conforming to IS: 15622(thickness to be specified by the manufacturer), of approved make, in all colours,shades except burgundy, bottle green, black of any size as approved by Engineerin-Charge,in skirting, risers of steps and dados, over 12 mm thick bed of cementmortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @3.3kg per sqm, including pointing in white cement mixed with pigment of matchingshade complete. (Based on 8.31 DAR)			
	Net Total	120.000sqm	@1190.03/sqm	142803.60
2.009	OD215/2022-2023			
	Providing and laying industrial floor tiles (12 mm thickness textured) of 1st quality conforming to IS :4457 of approved make ,in clours such as white ,ivory ,grey, fume red brown ,laid on 20 mm thick cement mortar 1:4 (1 cement:4 coarse sand), including pointing the joints with white cement and matching pigment etc .' complete Details of cost for 1 sqm MATERIAL Industrial floor tiles 300x300 mm size = 1 sqm Add for wastage & breakage @ 2.5% = 0.025 sqm Total = 1.025 sqm			
	Net Total	900.000sqm	@1903.73/sqm	1713357.00
2.010	OD221/2022-2023			
	wearing coat on deck slab using cement concrete 1:1.5:3 using 15mm broken stone for a thickness of 50mm including finishing with abrasion resistant hard top or equivalent chemical confirming to IS 1237 C-1980 &4kg/m2 of flooring including floated hard and trowelled smooth in 2 layers inclusive of all labour charges etc and including provision for making necessary grooves			

EST No. :HED/CEHED/EST/105/2022_5_4_4 (Edit Id : 8)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	for various joints but excluding cost of joint fillior and labour charges for filling."			
	Net Total	1300.000sqm	@652.60/sqm	848380.00
2.011	13.43.1			
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer			
	Net Total	1765.000sqm	@69.33/sqm	122367.45
2.012	13.46.1			
	Finishing walls with Acrylic Smooth exterior paint of required shade:New work (Two or more coat applied @ 1.67 ltr/10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/10 sqm)			
	Net Total	1004.400sqm	@190.25/sqm	191087.10
2.013	13.44.1			
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)			
	Net Total	1852.000sqm	@105.36/sqm	195126.72
	Heading Total(Rs)			6035867.07
	Total Estimation PAC			50030193.30
4	**Extra Charges**			
3.001	Provision for GST			
	50030193.30		18.00%	9005434.79
	Grand Total			59035628.09
	Round off			64371.91
	Rounded Total(Rs)			59100000.00
	Rupees Five Crore Ninety One Lakh			

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EST No. :HED/CEHED/EST/105/2022_5_4_4 (Edit Id : 8)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in kasaragod District -Construction of Wharf and Auction Hall-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Auction hall and wharf						
1.001	12.22						
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.						
	Auction hall						
	MS liner for wharf	2*24	6.000	3.14*.75		0.047100	31.945
	auction hall	2*12	6.000	3.14*.75		0.047100	15.973
	Rounding	1.000	1.082				1.082
	Total						**49.000**
						Total Quantity in MT	**49.000**
1.002	12.23.3						
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm						
	Auction hall						
	auction hall (upto +1.6m CD level)	2*12			25.75+1.6		656.400
	Total						**656.400**
	wharf						
	wharf (upto +1.6m CD level)	2*24			25.75+1.6		1312.800
	Total						**1312.800**
						Total Quantity in metre	**1969.200**
1.003	OD216/2022-2023						
	Providing and fixing reinforcement using High Corrosion Resistant (HCR) for the RCC works for superstructure including conveying, straightening, cutting, bending and tying in position etc. complete as per drawings, detailed specifications and directions of the Engineer-in-charge.						
	Auction hall & wharf piles						
	25 mm Dia rft	2*36*8	27.350			0.003850	60.651
	lap 25mm	2*36*8*2	1.000			0.003850	4.435

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EST No. :HED/CEHED/EST/105/2022_5_4_4 (Edit Id : 8)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	10 mm stirrups at 20cm c/c	2*36*125	3.140	0.650		0.000620	11.389
	stiffner 12mm	2*36*6	3.140	0.650		0.000890	0.785
	Total						**77.260**
	Auction hall-beam and slab						
	main beam for auction hall LS Wt taken @ 120Kg/m3	2.000	60.000	0.300	0.550	0.120000	2.376
	main beam for Wharf @ 120Kg/m3	2.000	120.000	0.300	0.550	0.120000	4.752
	Cross Beam @ 120Kg/m3	12.000	13.000	0.300	0.550	0.120000	3.089
	end beam for auction hall @ 120Kg/m3	24.000	6.600	0.300	0.550	0.120000	3.136
	Deck slab for auction hall @ 120Kg/m3	1.000	60.000	20.000	0.200	0.120000	28.800
	wharf @ 120Kg/m3	1.000	60.000	6.500	0.200	0.120000	9.360
	-do-	1.000	60.000	6.600	0.200	0.120000	9.504
	Facia wall @ 120Kg/m3	1.000	120.000	0.200	1.500	0.120000	4.320
	rounding	1.000	1.614				1.614
	Total						**66.951**
	Auction Hall						
	Column @ 150 kg/m3	2*12	0.400	0.400	4.500	0.150000	2.592
	Column @ 150 kg/m3	1*12	0.400	0.400	6.000	0.150000	1.728
	Beams @ 150 kg/m3	3.000	60.000	0.300	0.550	0.150000	4.455
	Beams @ 150 kg/m3	12*2	6.150	0.350	0.550	0.150000	4.262
	Beams @ 150 kg/m3	2.000	62.000	8.100	0.175	0.150000	26.366
	Rounding	1.000	0.597				0.597
	Total						**40.000**
						Total Quantity in MT	**184.211**
1.004	14.1.C.1						

EST No. :HED/CEHED/EST/105/2022_5_4_4 (Edit Id : 8)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Furnishing and Placing Reinforced Cement Concrete Grade M30 Using Concrete Mixer in super-structure as per drawing and Technical Specification						
	Auction hall-beam and slab						
	main beam for auction hall LS Wt taken as 120	12*2	6.000	0.300	0.550		23.760
	Cross Beam	12*4	5.200	0.300	0.550		41.184
	end beam for auction hall	12.000	5.000	0.300	0.550		9.900
	Deck slab for auction hall	1.000	60.000	15.000	0.175		157.500
	wharf beam	12*2	5.000	0.300	0.550		19.800
		12*2	5.200	0.300	0.550		20.592
	wharf	1.000	60.000	5.000	0.175		52.500
	wharf	1.000	60.000	6.600	0.175		69.300
	Facia wall	1.000	120.000	0.200	1.500		36.000
	Column	2*20	0.400	0.400	4.500		28.800
	Column	20.000	0.400	0.400	6.000		19.200
	Beam	3.000	60.000	0.300	0.550		29.700
	Beam	12*2	6.150	0.350	0.550		28.413
	Slab	2.000	62.000	8.100	0.175		175.770
	Slab	1.000	7.581				7.581
	Total						**720.000**
						Total Quantity in cum	**720.000**
2	Auction hall- beams and slabs						
2.001	10.22						
	Welding by gas or electric plant including transportation of plant at site etc. complete.						
	piles						
	lap 25mm	72*8*2*4					4608.000
	10 mm stirrups at 20cm c/c	72*12 5*8					72000.000
	stiffner 12mm c/c	72*6*8					3456.000
	Rounding	436.000					436.000
	Total						**80500.000**
						Total Quantity in cm	**80500.000**
2.002	OD220/2022-2023						

EST No. :HED/CEHED/EST/105/2022_5_4_4 (Edit Id : 8)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Extra for addition of synthetic polyester triangular fibre of length 12 mm, effective diameter 10-40 microns and specific gravity of 1.34 to 1.40 in cement concrete/RCC/ Flooring / water retaining structures by using 125 gms of synthetic polyester triangular fibre for 50 kgs cement used as per directions of Engineer -in- Charge based on 4.18						
	Synthetic Fibre - slab						
	Deck slab for auction hall (406.67x0.125/50 = 1.017)	1.000	60.000	15.000	0.175	1.017000	160.178
	wharf (406.67x0.125/50 = 1.017)	1.000	60.000	5.000	0.175	1.017000	53.393
	wharf (406.67x0.125/50 = 1.017)	1.000	60.000	6.600	0.175	1.017000	70.478
	Rounding	1.000	15.951				15.951
	Total						**300.000**
						Total Quantity in kg	**300.000**
2.003	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	slab						
	slab	2.000	62.000	8.100			1004.400
	rounding	1.000	24.900				24.900
	Total						**1029.300**
	beam						
		-2.000	60.000	0.300			-36.000
		12.000	13.500	0.350			56.700
	Total						**20.700**
						Total Quantity in sqm	**1050.000**
2.004	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	beam						
		3.000	60.000	1.400			252.000
		12*2	8.100	1.450			281.880
	rounding	1.000	6.120				6.120
	Total						**540.000**
						Total Quantity in sqm	**540.000**
2.005	5.9.6						

EST No. :HED/CEHED/EST/105/2022_5_4_4 (Edit Id : 8)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	Auction hall column						
	columns	2*12	1.600		4.500		172.800
		12.000	1.600		6.000		115.200
	rounding	1.000	2.000				2.000
	Total						**290.000**
						Total Quantity in sqm	**290.000**
2.006	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	Auction hall						
	column	2*20	1.600		4.500		288.000
	column	20.000	1.600		6.000		192.000
	beam	3.000	60.000	1.400			252.000
	beam	12*2	6.150	1.450			214.020
	slab	2.000	62.000	8.100			1004.400
	rounding	1.000	4.580				4.580
	Total						**1955.000**
						Total Quantity in sqm	**1955.000**
2.007	13.7.1						
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)						
	slab						
		2.000	62.000	8.100			1004.400
	rounding	1.000	0.600				0.600
	Total						**1005.000**
						Total Quantity in sqm	**1005.000**
2.008	OD1854/2022-2023						
	Providing and fixing Ist quality ceramic glazed wall tiles conforming to IS: 15622(thickness to be specified by the manufacturer), of approved make, in all colours,shades except burgundy, bottle green, black of any size as approved by Engineerin-Charge,in skirting, risers of steps and dados, over 12 mm thick bed of cementmortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @3.3kg per sqm, including pointing in white cement mixed with pigment of matchingshade complete. (Based on 8.31 DAR)						
	For Column						
	Column	3*12	1.600	2.000		1.000000	115.200
	rounding	1.000	4.800				4.800
	Total						**120.000**

EST No. :HED/CEHED/EST/105/2022_5_4_4 (Edit Id : 8)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in sqm	**120.000**
2.009	OD215/2022-2023						
	Providing and laying industrial floor tiles (12 mm thickness textured) of 1st quality conforming to IS :4457 of approved make ,in clours such as white ,ivory ,grey, fume red brown ,laid on 20 mm thick cement mortar 1:4 (1 cement:4 coarse sand), including pointing the joints with white cement and matching pigment etc .' complete Details of cost for 1 sqm MATERIAL Industrial floor tiles 300x300 mm size = 1 sqm Add for wastage & breakage @ 2.5% = 0.025 sqm Total = 1.025 sqm						
	Auction hall						
		1.000	60.000	15.000			900.000
	Total						**900.000**
						Total Quantity in sqm	**900.000**
2.010	OD221/2022-2023						
	wearing coat on deck slab using cement concrete 1:1.5:3 using 15mm broken stone for a thickness of 50mm including finishing with abrasion resistant hard top or equivalent chemical confirming to IS 1237 C-1980 &4kg/m2 of flooring including floated hard and trowelled smooth in 2 layers inclusive of all labour charges etc and including provision for making necessary grooves for various joints but excluding cost of joint fillior and labour charges for filling."						
	wharf						
		60.000	15.000				900.000
		60.000	6.600				396.000
	rounding	1.000	4.000				4.000
	Total						**1300.000**
						Total Quantity in sqm	**1300.000**
2.011	13.43.1						
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	Auction hall						
	column	2*20	1.600		2.500		160.000
	column	20.000	1.600		4.000		128.000
	beam	3.000	60.000	1.400			252.000
	beam	12*2	6.150	1.450			214.020
	slab	2.000	62.000	8.100			1004.400
	rounding	1.000	6.580				6.580
	Total						**1765.000**
						Total Quantity in sqm	**1765.000**
2.012	13.46.1						

EST No. :HED/CEHED/EST/105/2022_5_4_4 (Edit Id : 8)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Finishing walls with Acrylic Smooth exterior paint of required shade:New work (Two or more coat applied @ 1.67 ltr/10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/10 sqm)						
	slab						
		2.000	62.000	8.100			1004.400
	Total						**1004.400**
						Total Quantity in sqm	**1004.400**
2.013	13.44.1						
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)						
	Auction hall						
	column	2*20	1.600		2.500		160.000
	column	20.000	1.600		4.000		128.000
	beam	3.000	60.000	1.400			252.000
	beam	12*2	6.150	1.450			214.020
	slab	2.000	62.000	8.100			1004.400
	rounding	1.000	5.920				5.920
	Total						**1764.340**
	deduction -beam						
		2.000	60.000	0.300			36.000
		12*2.000	6.150	0.350			51.660
	Total						**87.660**
						Total Quantity in sqm	**1852.000**

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Construction of Canteen, Rest shed, Locker room and gear shed-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Locker Rooms, Shop Rooms, Canteen & Net mending shed**			
1.001	2.31			
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared			
	Net Total	1000.000sqm	@14.48/sqm	14480.00
1.002	2.33.1			
	Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth			
	Net Total	10.000each	@439.60/each	4396.00
1.003	2.8.1			
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil			
	Net Total	790.000cum	@291.42/cum	230221.80
1.004	OD1735/2022-2023			
	Coconut Pile - Supplying and stacking well matured straight coconut post for driving down through various strata bellow bed level including cost conveyance labor charges etc complete.			
	Net Total	1800.000metre	@136.76/metre	246168.00
1.005	OD149/2022-2023			
	OD 6380 / 2020-2021 : Coconut Pile - Driving down coconut pile to lines and levels through soft to medium clay soil strata including all hire charges and labour and all other appliances necessary for pile driving down after pointing the bottom end. Details for one post of 6m long 15 numbers per day 6X15 = 90m Details for 90m length			
	Net Total	1800.000metre	@213.34/metre	384012.00
1.006	OD1736/2022-2023			
	Bailing out water Using 5HP Pump- Bailing out water with 5HP engine and pump set including conveyance to site and erection, cost of fuel, lubrication oil and other			

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	stores, pay of staff etc complete			
	Net Total	240.000hour	@372.81/hour	89474.40
1.007	60.7.2			
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.			
	Net Total	122.000cum	@2557.65/cum	312033.30
1.008	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	175.000cum	@6687.21/cum	1170261.75
1.009	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	73.000cum	@7069.78/cum	516093.94
1.010	50.2.25.1			
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge			
	Net Total	200.000cum	@515.98/cum	103196.00
1.011	5.1.2			
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size			
	Net Total	118.000cum	@8914.94/cum	1051962.92
1.012	5.2.2			
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)			
	Net Total	52.000cum	@10748.82/cum	558938.64
1.013	5.3			
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).			

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	271.000cum	@11277.61/cum	3056232.31
1.014	5.22.6			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - Mechanically Treated bars of grade Fe-500D or more			
	Net Total	53700.000kilogram	@96.46/kilogram	5179902.00
1.015	10.6.2			
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.20 mm M.S. laths with 1.20 mm thick top cover			
	Net Total	100.000sqm	@3238.32/sqm	323832.00
1.016	10.7			
	Providing and fixing ball bearing for rolling shutters.			
	Net Total	24.000no	@484.97/no	11639.28
1.017	50.6.1.5			
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x20cm or nearest available size confirming to IS 2185 Part I of 1979 for super structure up to floor two level thickness 20cm and above in: CM 1:6 (1 cement : 6 coarse sand) etc complete			
	Net Total	180.000cum	@6580.80/cum	1184544.00
1.018	50.6.2.1			
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x15 cm or nearest available size confirming to IS 2185 part I of 1979 for foundation and plinth with thickness 15cm in: CM 1:6 (1 cement :6 coarse sand) etc complete			
	Net Total	15.000cum	@6179.60/cum	92694.00
1.019	9.1.1			
	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately).Second class teak wood			
	Net Total	2.300cum	@150367.20/cum	345844.56
1.020	9.7.1			
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick:Second class teak wood			

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	25.000sqm	@3398.47/sqm	84961.75
1.021	9.9.1.2			
	Providing and fixing glazed shutters for door, windows and clerestory windows using 4 mm thick float glass panes including ISI marked M.S. Pressed butt hinges bright finished of required size with necessary screws.30 mm thick			
	Net Total	53.000sqm	@4575.39/sqm	242495.67
1.022	9.48.2			
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc			
	Net Total	830.000kg	@211.94/kg	175910.20
1.023	9.53			
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	188.000each	@207.00/each	38916.00
1.024	13.1.1			
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	1290.000sqm	@308.22/sqm	397603.80
1.025	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	1945.000sqm	@262.57/sqm	510698.65
1.026	13.11			
	18 mm cement plaster in two coats under layer 12 mm thick cement plaster 1:5 (1 cement : 5 coarse sand) finished with a top layer 6 mm thick cement plaster 1:6 (1 cement : 6 fine sand).			
	Net Total	1255.000sqm	@461.20/sqm	578806.00
1.027	11.41.2			
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.			
	Net Total	590.000sqm	@1733.20/sqm	1022588.00
1.028	OD156/2022-2023			
	Providing and laying industrial floor tiles (12 mm thickness textured) of 1st quality conforming to IS :4457 of approved make ,in clours such as white ,ivory ,grey, fume red brown ,laid on 20 mm thick cement mortar 1:4 (1 cement:4 coarse sand), including pointing the joints with white cement and matching pigment etc .' complete Details of cost for 1 sqm MATERIAL Industrial floor tiles 300x300 mm size = 1 sqm Add for wastage & breakage @ 2.5% = 0.025			

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	sqm Total = 1.025 sqm			
	Net Total	260.000sqm	@1903.73/sqm	494969.80
1.029	9.97.3			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm			
	Net Total	28.000no	@103.95/no	2910.60
1.030	50.9.15.1			
	Supplying and fixing 200 mm Aluminium aldrop			
	Net Total	14.000no	@171.51/no	2401.14
1.031	9.100.2			
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm			
	Net Total	14.000no	@61.02/no	854.28
1.032	50.9.15.4			
	Providing and fixing iron hooks and eyes: 150 mm			
	Net Total	52.000no	@16.42/no	853.84
1.033	50.9.15.5			
	Providing and fixing iron hooks and eyes: 100 mm			
	Net Total	156.000no	@14.10/no	2199.60
1.034	13.37.1			
	White washing with lime to give an even shade:New work (three or more coats)			
	Net Total	3808.418sqm	@32.96/sqm	125525.46
1.035	13.44.1			
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)			
	Net Total	3808.418sqm	@105.36/sqm	401254.92
1.036	13.62.1			
	Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade:Two or more coats on new work over an under coat of suitable shade with ordinary paint of approved brand and manufacture .			
	Net Total	370.000sqm	@204.63/sqm	75713.10
1.037	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	210.000sqm	@329.03/sqm	69096.30
1.038	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended			

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EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	floors, roofs, landings, balconies and access platform			
	Net Total	1100.000sqm	@800.47/sqm	880517.00
1.039	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	1162.000sqm	@637.63/sqm	740926.06
1.040	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	365.000sqm	@847.44/sqm	309315.60
1.041	5.9.16.1			
	Centering and shuttering including strutting, etc. and removal of form for: Edges of slabs and breaks in floors and wallsUnder 20 cm wide			
	Net Total	225.000metre	@200.11/metre	45024.75
	Heading Total(Rs)			21079469.42
	Total Estimation PAC			21079469.42
3	**Extra Charges**			
2.001	Provision for GST			
	21079469.42		18.00%	3794304.50
	Grand Total			24873773.92
	Round off			26226.08
	Rounded Total(Rs)			24900000.00
	Rupees Two Crore Forty Nine Lakh			

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Construction of Canteen, Rest shed, Locker room and gear shed-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Locker Rooms, Shop Rooms, Canteen & Net mending shed						
1.001	2.31						
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared						
	for Net mending shed and locker rooms						
	Net mending shed and locker rooms	1.000	50.000	20.000			1000.000
	Total						**1000.000**
						Total Quantity in sqm	**1000.000**
1.002	2.33.1						
	Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth						
	Trees						
	Trees	10.000					10.000
	Total						**10.000**
						Total Quantity in each	**10.000**
1.003	2.8.1						
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil						
	for wall						
	long wall	3.000	44.000	1.800	1.950		463.320
	cross wall	14*2	3.200	1.800	1.950		314.496
	Rounding	1.000	12.183				12.183
	Rounding	1.000	0.001				0.001
	Total						**790.000**
						Total Quantity in cum	**790.000**
1.004	OD1735/2022-2023						

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Coconut Pile - Supplying and stacking well matured straight coconut post for driving down through various strata bellow bed level including cost conveyance labor charges etc complete.						
	For Net mending shed and locker rooms						
	Foundation	450.000	4.000			1.000000	1800.000
	Total						**1800.000**
						Total Quantity in metre	**1800.000**
1.005	OD149/2022-2023						
	OD 6380 / 2020-2021 : Coconut Pile - Driving down coconut pile to lines and levels through soft to medium clay soil strata including all hire charges and labour and all other appliances necessary for pile driving down after pointing the bottom end. Details for one post of 6m long 15 numbers per day 6X15 = 90m Details for 90m length						
	for foundation						
	for foundation	450.000	4.000				1800.000
	Total						**1800.000**
						Total Quantity in metre	**1800.000**
1.006	OD1736/2022-2023						
	Bailing out water Using 5HP Pump- Bailing out water with 5HP engine and pump set including conveyance to site and erection, cost of fuel, lubrication oil and other stores, pay of staff etc complete						
	For Net mending shed and locker rooms						
	Foundation (Footing)	30.000	8.000			1.000000	240.000
	Total						**240.000**
						Total Quantity in hour	**240.000**
1.007	60.7.2						
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.						
	for wall						
	long wall	3.000	44.000	1.800	0.300		71.280
	cross wall	14*2	3.200	1.800	0.300		48.384
	rounding	1.000	2.336				2.336
	Total						**122.000**
						Total Quantity in cum	**122.000**
1.008	4.1.8						

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	strip footing bottom						
	Long wall	3.000	44.000	1.800	0.150		35.640
	cross wall	14*2	3.200	1.800	0.150		24.192
	rounding	1.000					1.000
	Total						**60.832**
	RR masonry bottom						
	Long wall	3.000	44.000	0.750	0.150		14.850
	cross wall	14*2	4.250	0.750	0.150		13.388
	rounding	1.000	1.928				1.928
	Total						**30.166**
	flooring						
	net mending shed	1.000	23.200	10.000	0.100		23.200
	locker and shop rooms	1.000	3.100	3.500	0.100		1.085
	verandah	2.000	16.200	1.500	0.100		4.860
	step	2*2	45.000	0.300	1.000		54.000
	rounding	1.000	0.857	1.000	1.000		0.857
	Total						**84.002**
						Total Quantity in cum	**175.000**
1.009	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	RR masonry						
	Long wall	3.000	44.000	0.450	0.600		35.640
	cross wall	14*2	4.550	0.450	0.600		34.398
	rounding	1.000	2.962				2.962
	Total						**73.000**
						Total Quantity in cum	**73.000**
1.010	50.2.25.1						
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge						
	filling						
	net mending shed	1.000	23.000	10.000	0.500		115.000

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	locker and shop rooms	10.000	3.100	3.500	0.500		54.250
	veranda	2.000	16.200	1.500	0.500		24.300
	rounding	1.000	6.450				6.450
	Total						**200.000**
						Total Quantity in cum	**200.000**
1.011	5.1.2						
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size						
	strip footing						
	long wall	3.000	44.000	1.500	0.200		39.600
	long wall	3.000	44.000	0.300	0.250		9.900
	cross wall	14*2	3.500	1.500	0.200		29.400
	cross wall	14*2	3.500	0.300	0.250		7.350
	Total						**86.250**
	plinth beam						
	long wall	3.000	44.000	0.300	0.450		17.820
	cross wall	14*2	5.000	0.300	0.300		12.600
	rpounding	1.000	1.330				1.330
	Total						**31.750**
						Total Quantity in cum	**118.000**
1.012	5.2.2						
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)						
	column						
	GF	3*14	0.450	0.300	5.500		31.185
	FF	3*14	0.450	0.300	3.500		19.845
	rounding	1.000	0.970		1.000		0.970
	Total						**52.000**
						Total Quantity in cum	**52.000**
1.013	5.3						

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).						
	GF lintel, sunshade						
	GF sunshade	1.000	112.000	0.900	0.080		8.064
	GF lintel all round	1.000	108.400	0.200	0.200		4.336
	locker and shop rooms front side	2.000	16.800	0.200	0.200		1.344
	do- cross wall	4.000	7.000	0.200	0.150		0.840
	do- long wall	4.000	16.800	0.200	0.150		2.016
	stair room	2.000	32.000	0.200	0.150		1.920
	Total						**18.520**
	GF roof slabs						
	GF	1.000	46.200	11.200	0.150		77.616
	Stair landing	2.000	5.500	1.500	0.150		2.475
		2.000	2.500	1.500	0.150		1.125
		2.000	3.100	1.500	0.150		1.395
	step	2*25	1.500	0.300	0.150		3.375
	Deduct stair room roof	-1.000	4.800	11.200	0.150		-8.064
	Total						**77.922**
	GF beams						
	GF 1	14.000	10.000	0.300	0.500		21.000
	GF 2	3.000	45.000	0.300	0.350		14.175
	Total						**35.175**
	FF lintel, sunshade						
	FF sunshade	1.000	112.000	0.900	0.080		8.064
	FF lintel all round	1.000	108.400	0.200	0.200		4.336
	lintel rooms front side	2.000	16.800	0.200	0.200		1.344
	do-cross wall	4.000	7.000	0.200	0.150		0.840
	do-long wall	1.000	16.800	0.200	0.150		0.504
	stair room	2.000	32.000	0.200	0.150		1.920
	Total						**17.008**
	FF roof slabs						
	FF	1.000	46.200	11.200	0.150		77.616

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	stair landing	2.000	5.500	1.500	0.150		2.475
		2.000	2.500	1.500	0.150		1.125
		2.000	3.100	1.500	0.150		1.395
	step	2*25	1.500	0.300	0.150		3.375
	Total						**85.986**
	FF beams						
	FF 1	14.000	10.000	0.300	0.500		21.000
	FF 2	3.000	45.000	0.300	0.350		14.175
	rounding	1.000	1.214				1.214
	Total						**36.389**
						Total Quantity in cum	**271.000**
1.014	5.22.6						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - Mechanically Treated bars of grade Fe-500D or more						
	Strip footing						
	for strip footing	1.000	86.250			120.000000	10350.000
	Total						**10350.000**
	Plinth beam						
	for Plinth beam	1.000	31.750			150.000000	4762.500
	Total						**4762.500**
	Column						
	for column	1.000	52.000			150.000000	7800.000
	Total						**7800.000**
	GF lintel, sunshade						
	for GF lintel, sunshade	1.000	18.520			100.000000	1852.000
	Total						**1852.000**
	GF Roof slab						
	for GF Roof slab	1.000	77.922			100.000000	7792.200
	Total						**7792.200**
	GF beams						
	for GF beams	1.000	35.175			150.000000	5276.250
	Total						**5276.250**

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	FF lintel, Sunshade						
	for FF lintel, Sunshade	1.000	17.008			100.000000	1700.800
	Total						**1700.800**
	FF roof slab						
	for FF roof slab	1.000	85.986			100.000000	8598.600
	Total						**8598.600**
	FF beams						
	for FF beams	1.000	36.389			150.000000	5458.350
	Total						**5458.350**
	Rounding						
		1.000	109.300				109.300
	Total						**109.300**
						Total Quantity in kilogram	**53700.000**
1.015	10.6.2						
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.20 mm M.S. laths with 1.20 mm thick top cover						
	RS						
	FF	10.000	3.100	2.400			74.400
	GF	2.000	4.800	2.400			23.040
	rounding	1.000	2.560				2.560
	Total						**100.000**
						Total Quantity in sqm	**100.000**
1.016	10.7						
	Providing and fixing ball bearing for rolling shutters.						
	GF						
	GF	12*2					24.000
	Total						**24.000**
						Total Quantity in no	**24.000**
1.017	50.6.1.5						

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x20cm or nearest available size confirming to IS 2185 Part I of 1979 for super structure up to floor two level thickness 20cm and above in: CM 1:6 (1 cement : 6 coarse sand) etc complete						
	GF						
	net mending shed above lintel level	1.000	56.000	0.200	0.600		6.720
	locker and shop rooms	5.000	7.000	0.200	3.100		21.700
		3.000	15.000	0.200	3.250		29.250
	verandah	2.000	15.000	0.200	0.600		3.600
	stair room	1.000	34.000	0.200	9.000		61.200
	Total						**122.470**
	Deduction GF						
	RS	-10.000	3.100	0.200	2.400		-14.880
		-2.000	4.800	0.200	2.400		-4.608
	Total						**-19.488**
	FF						
	canteen	1.000	56.000	0.200	3.100		34.720
	verandah above lintel level	2.000	15.000	0.200	0.900		5.400
	rooms	5.000	7.000	0.200	3.100		21.700
		3.000	15.000	0.200	3.250		29.250
	Total						**91.070**
	Deduction FF						
	D 90X120	-14.000	0.900	0.200	1.200		-3.024
	W3 150X150	-26.000	1.500	0.200	1.500		-11.700
	Total						**-14.724**
	rounding						
		1.000	0.672				0.672
	Total						**0.672**
						Total Quantity in cum	**180.000**
1.018	50.6.2.1						
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x15 cm or nearest available size confirming to IS 2185 part I of 1979 for foundation and plinth with thickness 15cm in: CM 1:6 (1 cement :6 coarse sand) etc complete						
	parapet						
	parapet	1.000	115.000	0.150	0.700		12.075

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	2.925				2.925
	Total						**15.000**
						Total Quantity in cum	**15.000**
1.019	9.1.1						
	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately).Second class teak wood						
	First floor						
	D 90x210	14.000	37.632/1000			1.000000	0.527
	W3 150x150	26.000	66.460/1000			1.000000	1.728
	Rounding	1.000	0.045			1.000000	0.045
	Total						**2.300**
						Total Quantity in cum	**2.300**
1.020	9.7.1						
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick:Second class teak wood						
	Door						
	D 90X120	14.000	1.591				22.274
	rounding	1.000	2.726				2.726
	Total						**25.000**
						Total Quantity in sqm	**25.000**
1.021	9.9.1.2						
	Providing and fixing glazed shutters for door, windows and clerestory windows using 4 mm thick float glass panes including ISI marked M.S. Pressed butt hinges bright finished of required size with necessary screws.30 mm thick						
	window						
	W3 150X150	26.000	1.940				50.440
	rounding	1.000	2.560				2.560
	Total						**53.000**
						Total Quantity in sqm	**53.000**
1.022	9.48.2						
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc						

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	window						
	W3 150X150	26.000	13.000	1.500	1.560		790.920
	add 5%	1.000	36.000				36.000
	rounding	1.000	3.080				3.080
	Total						**830.000**
						Total Quantity in kg	**830.000**
1.023	9.53						
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	hold fast						
	D 90X120	14.000	6.000				84.000
	W3 150X150	26.000	4.000				104.000
	Total						**188.000**
						Total Quantity in each	**188.000**
1.024	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	Inside wall						
	locker and shop rooms	10.000	13.200		3.100		409.200
	verandah	2*2	15.000		0.600		36.000
	net mending shed - above lintel level	1.000	56.000		0.600		33.600
	strair room	2.000	18.700		9.000		336.600
	canteen	1.000	66.000		3.100		204.600
	rooms	10.000	13.200		3.100		409.200
	Passage	1.000	13.500		3.000		40.500
	rounding	1.000	2.700				2.700
	Total						**1472.400**
	Deductions						
	D 90x210	-14.000	0.900		2.100		-26.460
	R S	-10.000	3.100		2.400		-74.400
		-2.000	4.800		2.400		-23.040
	window	-26.000	1.500		1.500		-58.500
	Total						**-182.400**

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in sqm	**1290.000**
1.025	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	ceiling-ground floor						
	net mending shed	1.000	23.200	10.000			232.000
	stair room	2.000	9.400	4.800			90.240
	verandah- GF	2.000	16.200	1.450			46.980
	shop rooms and locker rooms	10.000	3.100	3.500			108.500
	sunshade	1.000	113.600	0.900			102.240
	rounding	1.000	5.519				5.519
	Total						**585.479**
	ceiling-first floor						
	canteen	1.000	23.200	10.000			232.000
	verandah	2.000	16.200	1.450			46.980
	rooms	10.000	3.100	3.500			108.500
	sunshade	1.000	113.600	0.900			102.240
	rounding	1.000	5.519				5.519
	Total						**495.239**
	column						
	Ground floor	3*14	1.500		3.100		195.300
	First floor	3*14	1.500		3.100		195.300
	rounding	1.000	10.000				10.000
	Total						**400.600**
	ground floor-beams						
	GF 1	14.000	10.000	1.000			140.000
	GF 2	3.000	45.000	0.600			81.000
	rounding	1.000	10.000				10.000
	Total						**231.000**
	FF beams						
	FF 1	14.000	10.000	1.000			140.000
	FF 2	3.000	45.000	0.600			81.000
	rounding	1.000	11.682				11.682
	Total						**232.682**
						Total Quantity in sqm	**1945.000**
1.026	13.11						

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	18 mm cement plaster in two coats under layer 12 mm thick cement plaster 1:5 (1 cement : 5 coarse sand) finished with a top layer 6 mm thick cement plaster 1:6 (1 cement : 6 fine sand).						
	outer wall						
	ground floor	1.000	110.000		0.600		66.000
	ground floor	1.000	110.000		3.100		341.000
	rounding	1.000					1.000
	Total						**408.000**
	parappet,roof top						
	first floor	2.000	111.000		0.750		166.500
	roof slab top	1.000	45.400		10.400		472.160
	sunshade top	2.000	113.600		0.900		204.480
	rounding	1.000	3.860				3.860
	Total						**847.000**
						Total Quantity in sqm	**1255.000**
1.027	11.41.2						
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.						
	Flooring						
	shop room and locker room	10.000	3.500	3.100			108.500
	verandah - GF	2.000	16.200	1.500			48.600
	Step	2*25	1.500	0.300			22.500
		2*25	1.500	0.150			11.250
	Landing	2*3	1.500	1.500			13.500
	Canteen	1.000	23.200	9.600			222.720
	rooms	10.000	3.500	3.100			108.500
	verandah	2.000	16.200	1.500			48.600
	rounding	1.000	5.830				5.830
	Total						**590.000**
						Total Quantity in sqm	**590.000**
1.028	OD156/2022-2023						

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and laying industrial floor tiles (12 mm thickness textured) of 1st quality conforming to IS :4457 of approved make ,in clours such as white ,ivory ,grey, fume red brown ,laid on 20 mm thick cement mortar 1:4 (1 cement:4 coarse sand), including pointing the joints with white cement and matching pigment etc .' complete Details of cost for 1 sqm MATERIAL Industrial floor tiles 300x300 mm size = 1 sqm Add for wastage & breakage @ 2.5% = 0.025 sqm Total = 1.025 sqm						
	flooring						
	net mending shed	1.000	23.200	10.000		1.000000	232.000
	rounding	1.000	28.000			1.000000	28.000
	Total						**260.000**
						Total Quantity in sqm	**260.000**
1.029	9.97.3						
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm						
	150mm						
	Doors	14.000	2.000				28.000
	Total						**28.000**
						Total Quantity in no	**28.000**
1.030	50.9.15.1						
	Supplying and fixing 200 mm Aluminium aldrop						
	doors						
	Doors	14.000	1.000				14.000
	Total						**14.000**
						Total Quantity in no	**14.000**
1.031	9.100.2						
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm						
	doors						
	Doors	14.000	1.000				14.000
	Total						**14.000**
						Total Quantity in no	**14.000**
1.032	50.9.15.4						
	Providing and fixing iron hooks and eyes: 150 mm						
	Windows						
		26.000	2.000				52.000

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**52.000**
						Total Quantity in no	**52.000**
1.033	50.9.15.5						
	Providing and fixing iron hooks and eyes: 100 mm						
	windows						
		26.000	3.000	2.000			156.000
	Total						**156.000**
						Total Quantity in no	**156.000**
1.034	13.37.1						
	White washing with lime to give an even shade:New work (three or more coats)						
	inside wall						
	locker and shop rooms	10.000	13.200		3.100		409.200
	verandah	2*2	15.000		0.600		36.000
	net mending shed - above lintel level	1.000	56.000		0.600		33.600
	strair room	2.000	18.700		9.000		336.600
	canteen	1.000	66.000		3.100		204.600
	rooms	10.000	13.200		3.100		409.200
	Passage	1.000	13.500		3.000		40.500
	rounding	1.000					1.000
	Total						**1470.700**
	Deductions						
	D 90x210	-14.000	0.900		2.100		-26.460
	R S	-10.000	3.100		2.400		-74.400
		-2.000	4.800		2.400		-23.040
	window	-26.000	1.500		1.500		-58.500
	Total						**-182.400**
	ceiling-ground floor						
	net mending shed	1.000	23.200	10.000			232.000
	stair room	2.000	9.400	4.800			90.240
	verandah- GF	2.000	16.200	1.450			46.980
	shop rooms and locker rooms	10.000	3.100	3.500			108.500
	sunshade	1.000	113.600	0.900			102.240

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	5.519				5.519
	Total						**585.479**
	ceiling-first floor						
	canteen	1.000	23.200	10.000			232.000
	verandah	2.000	16.200	1.450			46.980
	rooms	10.000	3.100	3.500			108.500
	sunshade	1.000	113.600	0.900			102.240
	rounding	1.000	5.519				5.519
	Total						**495.239**
	column						
	Ground floor	3*14	1.500		3.100		195.300
	First floor	3*14	1.500		3.100		195.300
	rounding	1.000	10.000				10.000
	Total						**400.600**
	ground floor-beams						
	GF 1	14.000	10.000	1.000			140.000
	GF 2	3.000	45.000	0.600			81.000
	rounding	1.000	10.000				10.000
	Total						**231.000**
	First floor-beams						
	FF 1	14.000	10.000	1.000			140.000
	FF 2	3.000	45.000	0.600			81.000
	rounding	1.000	10.000				10.000
	Total						**231.000**
	outer wall						
	ground floor	1.000	110.000		0.600		66.000
	first floo	1.000	110.000		3.100		341.000
	rounding	1.000					1.000
	Total						**408.000**
	parappet						
	first floor	2.000	111.000		0.750		166.500
	first floor	1.000	2.300				2.300
	Total						**168.800**
						Total Quantity in sqm	**3808.418**
1.035	13.44.1						
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)						

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	painting						
	locker and shop rooms	10.000	13.200		3.100	1.000000	409.200
	verandah	2*2	15.000		0.600	1.000000	36.000
	net mending shed - above lintel level	1.000	56.000		0.600	1.000000	33.600
	strair room	2.000	18.700		9.000	1.000000	336.600
	canteen	1.000	66.000		3.100	1.000000	204.600
	rooms	10.000	13.200		3.100	1.000000	409.200
	Passage	1.000	13.500		3.000	1.000000	40.500
	rounding	1.000				1.000000	1.000
	D 90x210	-14.000	0.900		2.100	1.000000	-26.460
	R S	-10.000	3.100		2.400	1.000000	-74.400
		-2.000	4.800		2.400	1.000000	-23.040
	window	-26.000	1.500		1.500	1.000000	-58.500
	(Ceiling GF) net mending shed	1.000	23.200	10.000		1.000000	232.000
	stair room	2.000	9.400	4.800		1.000000	90.240
	verandah- GF	2.000	16.200	1.450		1.000000	46.980
	shop rooms and locker rooms	10.000	3.100	3.500		1.000000	108.500
	sunshade	1.000	113.600	0.900		1.000000	102.240
	rounding	1.000	5.519			1.000000	5.519
	(Ceiling FF)canteen	1.000	23.200	10.000		1.000000	232.000
	verandah	2.000	16.200	1.450		1.000000	46.980
	rooms	10.000	3.100	3.500		1.000000	108.500

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	sunshade	1.000	113.600	0.900		1.000000	102.240
	rounding	1.000	5.519			1.000000	5.519
	(GF beams) GF 1	14.000	10.000	1.000		1.000000	140.000
	GF 2	3.000	45.000	0.600		1.000000	81.000
	rounding	1.000	10.000			1.000000	10.000
	(FF Beams) FF 1	14.000	10.000	1.000		1.000000	140.000
	FF 2	3.000	45.000	0.600		1.000000	81.000
	rounding	1.000	10.000			1.000000	10.000
	(Outer wall) ground floor	1.000	110.000		0.600	1.000000	66.000
	first floor	1.000	110.000		3.100	1.000000	341.000
	rounding	1.000				1.000000	1.000
	(Parapet) first floor	2.000	111.000		0.750	1.000000	166.500
	first floor	1.000	2.300			1.000000	2.300
	Total						**3407.818**
	For Column						
	Ground floor	3*14	1.500		3.100	1.000000	195.300
	First floor	3*14	1.500		3.100	1.000000	195.300
	Rounding	1.000	10.000			1.000000	10.000
	Total						**400.600**
						Total Quantity in sqm	**3808.418**
1.036	13.62.1						
	Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade:Two or more coats on new work over an under coat of suitable shade with ordinary paint of approved brand and manufacture .						
	new wood work						
	Door D	14.000	0.900	2.210	2.250		62.654
	Window	26.000	1.500	1.500	1.000		58.500

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**121.154**
	iron work						
	Iron bars window W3	26.000	3.000	0.440	1.360		46.675
	collapsible steelshutters	10.000	3.100	2.400	2.000		148.800
		2.000	4.800	2.400	2.000		46.080
	rounding	1.000	7.291	1.000	1.000		7.291
	Total						**248.846**
						Total Quantity in sqm	**370.000**
1.037	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	Strip footing						
	Long wall	3*2	44.000		0.200		52.800
		3*2	44.000		0.250		66.000
	cross wall	14*2*2	3.500		0.200		39.200
		14*2*2	3.500		0.250		49.000
	rounding	3.000	1.000				3.000
	Total						**210.000**
						Total Quantity in sqm	**210.000**
1.038	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Ground floor -roof slab						
	GF	1.000	46.200	11.200			517.440
	Stair -landing	2.000	5.500	1.500			16.500
		2.000	2.500	1.500			7.500
		2.000	3.100	1.500			9.300
	Step	2*25.000	1.500	0.300			22.500
	Deduct stair room roof	-1.000	4.800	11.200			-53.760
	Total						**519.480**
	FF roof slab						
	FF	1.000	46.200	11.200			517.440
	Stair -landing	2.000	5.500	1.500			16.500

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		2.000	2.500	1.500			7.500
		2.000	3.100	1.500			9.300
	Step	2*25.000	1.500	0.300			22.500
	rounding	1.000	7.280				7.280
	Total						**580.520**
						Total Quantity in sqm	**1100.000**
1.039	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	GF and FF lintels,sunshades, beams						
	GF lintels, sunshades-GF sunshade	1.000	112.000	0.900			100.800
	GF lintel all round	1.000	108.400	0.600			65.040
	locker and shop rooms front side	2.000	16.800	0.600			20.160
	do- cross wall	4.000	7.000	0.500			14.000
	do- long wall	4.000	16.800	0.500			33.600
	stair room	2.000	32.000	0.500			32.000
	Beams-GF 1	14.000	10.000	1.000			140.000
	GF 2	3.000	45.000	0.600			81.000
	FF lintels, sunshade-FF sunshade	1.000	112.000	0.900			100.800
	FF lintel all round	1.000	108.400	0.600			65.040
	lintel rooms front side	2.000	16.800	0.600			20.160
	do-cross wall	4.000	7.000	0.600			16.800
	do-long wall	1.000	16.800	0.600			10.080
	stair room	2.000	32.000	0.600			38.400
	Beams-FF 1	14.000	10.000	1.000			140.000
	FF 2	3.000	45.000	0.600			81.000
	Total						**958.880**
	Plinth beam						
	long wall	3*2	44.000		0.450		118.800
	cross wall	14*2*2	5.000		0.300		84.000
	rounding	1.000	0.320				0.320

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**203.120**
						Total Quantity in sqm	**1162.000**
1.040	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	column						
	GF	3*14	1.500		3.100		195.300
	FF	3*14	1.300		3.100		169.260
	rounding	1.000	0.440		1.000		0.440
	Total						**365.000**
						Total Quantity in sqm	**365.000**
1.041	5.9.16.1						
	Centering and shuttering including strutting, etc. and removal of form for: Edges of slabs and breaks in floors and wallsUnder 20 cm wide						
	Roof edge						
	edge of slab	2.000	111.600				223.200
	rounding	1.000	1.800				1.800
	Total						**225.000**
						Total Quantity in metre	**225.000**

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Compound wall and side Protection works-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Truck bay**			
1.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	920.000cum	@210.02/cum	193218.40
1.002	OD1738/2022-2023			
	Coconut Pile - Supplying and stacking well matured straight coconut post for driving down through various strata bellow bed level including cost conveyance labor charges etc complete.			
	Net Total	10570.000metre	@136.76/metre	1445553.20
1.003	OD206/2022-2023			
	OD 6380 / 2020-2021 : Coconut Pile - Driving down coconut pile to lines and levels through soft to medium clay soil strata including all hire charges and labour and all other appliances necessary for pile driving down after pointing the bottom end. Details for one post of 6m long 15 numbers per day 6X15 = 90m Details for 90m length			
	Net Total	9060.000metre	@213.34/metre	1932860.40
1.004	60.64.6			
	Cutting and removing the excess length of wooden piles to lines and levels and removing the cut end of piles and stacking within 150m			
	Net Total	3020.000each	@191.17/each	577333.40
1.005	60.7.6			
	Supplying and stacking granite stone 20 to 45 dm3 for dumping works- Supplying at site of work granite stone 20 to 45 dm3 in size (60% 45m3,30%30 to 40dm3 and 10% 20 to 30dm3 stones) for measurement (deducting not less than 15% for voids as fixed by the departmental officer at site) including all cost, conveyance, loading and unloading charges all other incidental charges all leads and lifts etc. complete as per the direction of the departmental officers at site.			
	Net Total	3040.000cum	@1994.90/cum	6064496.00
1.006	60.7.7			
	Conveyance and dumping of departmental granite stones-Conveyance of departmental granite stone 20 to 45 dm3 in size from stack at site and dumping in			

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	position (60% 45m3,30%30 to 40dm3 and 10% 20 to 30dm3 stones) to lines and levels to from the core of the sea wall as per approved design including all leads and lifts etc. complete as per the direction of the departmental officers at site.			
	Net Total	3040.000cum	@605.23/cum	1839899.20
1.007	4.1.5			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	81.600cum	@7229.54/cum	589930.46
1.008	16.96			
	Providing & making Gabion structure with Mechanically Woven Double Twisted Hexagonal Shaped Wire mesh Gabion Boxes as per IS 16014:2012,MORTH Clause 2500, of required size, Mesh Type 10x12(D=100 mm with tolerance of ±2%), Zinic+10%Al alloy+PVC coated, Mesh wire diameter 2.7/3.7mm (ID/OD),mechanically edged/selvedged with partitions at every 1m interval and shall have minimum 10 numbersof openings per meter of mesh perpendicular to twist, tying with lacing wire of diameter2.2/3.2mm(ID/OD), supplied @3% by weight of Gabion boxes, filled with boulders with least dimension of 200 mm, as per drawing, all complete as per directions of Engineer-in-charge			
	Net Total	5130.000cum	@4735.18/cum	24291473.40
1.009	OD287/2022-2023			
	Laying of geotextile filter between pitching and embankment slopes on which pitching is laid to prevent escape of the embankment material through the voids of the stone pitching / cement concrete block as well as to allow free movements of water with out creating any uplift head on the pitching (OD approved by SE NC Order no D4 /179/2016/SE dt 23.2.2017 item no E4)and in price ID no 2017/928 			
	Net Total	4530.000sqm	@113.81/sqm	515559.30
1.010	4.1.6			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)			
	Net Total	81.600cum	@7076.05/cum	577405.68
1.011	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	305.072cum	@10858.36/cum	3312581.60
1.012	5.34.1			

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	305.072cum	@80.55/cum	24573.55
1.013	4.3.1			
	Centering and shuttering including strutting, propping etc. and removal of form work for:Foundations, footings, bases for columns			
	Net Total	834.270sqm	@329.03/sqm	274499.86
1.014	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	592.651cum	@7069.78/cum	4189912.19
1.015	OD288/2022-2023			
	Laterate masonry with neatly dressed laterate stone of size 30x20x20cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc. 			
	Net Total	321.235cum	@7872.96/cum	2529070.31
1.016	OD5538/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - HCR			
	Net Total	17332.880kilogram	@96.62/kilogram	1674702.87
1.017	13.1.2			
	12 mm cement plaster of mix:1:6 (1 cement : 6 fine sand).			
	Net Total	4093.500sqm	@293.67/sqm	1202138.15
1.018	13.43.1			
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer			
	Net Total	4093.500sqm	@69.33/sqm	283802.36
1.019	13.44.1			
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)			
	Net Total	4093.500sqm	@105.36/sqm	431291.16
	Heading Total(Rs)			51950301.49
	Total Estimation PAC			51950301.49
3	**Extra Charges**			

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EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
2.001	Provision for GST			
		51950301.49	18.00%	9351054.27
			Grand Total	61301355.76
			Round off	98644.24
			Rounded Total(Rs)	61400000.00
	Rupees Six Crore Fourteen Lakh			

ePRICE
ePLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Compound wall and side Protection works-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Truck bay						
1.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	Excavation						
	for compound wall near main break water to entrance gate	1.000	67.000	0.800	0.800		42.880
	from entrance gate to lee ward break water	1.000	440.000	0.800	0.800		281.600
	for side protection , East side of river training	1.000	485.000	2.400	0.300		349.200
	for side protection , west of river training	1.000	205.000	2.400	0.300		147.600
	for side protection , west of river training	1.000	120.000	2.400	0.300		86.400
	Rounding qty	1.000	12.320	1.000	1.000		12.320
	Total						**920.000**
						Total Quantity in cum	**920.000**
1.002	OD1738/2022-2023						
	Coconut Pile - Supplying and stacking well matured straight coconut post for driving down through various strata bellow bed level including cost conveyance labor charges etc complete.						
	For Gabion box at 1m interval						
	Side protection wall near east side of river training	2*485	3.500			1.000000	3395.000
	_do_ (west)	2*205	3.500			1.000000	1435.000

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	_do_ (west)	2*120	3.500			1.000000	840.000
	Basin boundary between main and leeward break water	2*600	3.500			1.000000	4200.000
	Basin boundary near leeward break water	2*100	3.500			1.000000	700.000
	Total						**10570.000**
						Total Quantity in metre	**10570.000**
1.003	OD206/2022-2023						
	OD 6380 / 2020-2021 : Coconut Pile - Driving down coconut pile to lines and levels through soft to medium clay soil strata including all hire charges and labour and all other appliances necessary for pile driving down after pointing the bottom end. Details for one post of 6m long 15 numbers per day 6X15 = 90m Details for 90m length						
	coconut pile						
	Side protection wall near east side of river training	2*485	3.000			1.000000	2910.000
	_do_ (west)	2*205	3.000			1.000000	1230.000
	_do_ (west)	2*120	3.000			1.000000	720.000
	Basin boundary between main and leeward break water	2*600	3.000			1.000000	3600.000
	Basin boundary near leeward break water	2*100	3.000			1.000000	600.000
	Total						**9060.000**
						Total Quantity in metre	**9060.000**
1.004	60.64.6						
	Cutting and removing the excess length of wooden piles to lines and levels and removing the cut end of piles and stacking within 150m						
	excess length cutting						
	Side protection wall near east side of river training	2*485				1.000000	970.000

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	_do_ (west)	2*205				1.000000	410.000
	_do_ (west)	2*120				1.000000	240.000
	Basin boundary between main and leeward break water	2*600				1.000000	1200.000
	Basin boundary near leeward break water	2*100				1.000000	200.000
	Total						**3020.000**
						Total Quantity in each	**3020.000**
1.005	60.7.6						
	Supplying and stacking granite stone 20 to 45 dm3 for dumping works- Supplying at site of work granite stone 20 to 45 dm3 in size (60% 45m3,30%30 to 40dm3 and 10% 20 to 30dm3 stones) for measurement (deducting not less than 15% for voids as fixed by the departmental officer at site) including all cost, conveyance, loading and unloading charges all other incidental charges all leads and lifts etc. complete as per the direction of the departmental officers at site.						
	side protection wall						
	for side protection , East side of river training	1.000	485.000	2.400	0.450		523.800
	for side protection , west of river training	1.000	205.000	2.400	0.450		221.400
	for side protection , west of river training	1.000	120.000	2.400	0.450		129.600
	Basin boundary between main and leeward break water	1.000	600.000	2.400	1.000	1.000000	1440.000
	Basin boundary near leeward break water	1.000	300.000	2.400	1.000	1.000000	720.000
	roundig	5.200					5.200
	Total						**3040.000**
						Total Quantity in cum	**3040.000**
1.006	60.7.7						

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Conveyance and dumping of departmental granite stones-Conveyance of departmental granite stone 20 to 45 dm3 in size from stack at site and dumping in position (60% 45m3,30%30 to 40dm3 and 10% 20 to 30dm3 stones) to lines and levels to from the core of the sea wall as per approved design including all leads and lifts etc. complete as per the direction of the departmental officers at site.						
	for side protection wall						
	for side protection , East side of river training	1.000	485.000	2.400	0.450		523.800
	for side protection , west of river training	1.000	205.000	2.400	0.450		221.400
	for side protection , west of river training	1.000	120.000	2.400	0.450		129.600
	Basin boundary between main and leeward break water	1.000	600.000	2.400	1.000	1.000000	1440.000
	Basin boundary near leeward break water	1.000	300.000	2.400	1.000	1.000000	720.000
	rounding	1.000	5.200			1.000000	5.200
	Total						**3040.000**
						Total Quantity in cum	**3040.000**
1.007	4.1.5						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	foundation footing						
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.800	0.200		11.200
	from entrance gate to lee ward breakwater	1.000	440.000	0.800	0.200		70.400
	Total						**81.600**
						Total Quantity in cum	**81.600**
1.008	16.96						

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing & making Gabion structure with Mechanically Woven Double Twisted Hexagonal Shaped Wire mesh Gabion Boxes as per IS 16014:2012,MORTH Clause 2500, of required size, Mesh Type 10x12(D=100 mm with tolerance of ±2%), Zinic+10%Al alloy+PVC coated, Mesh wire diameter 2.7/3.7mm (ID/OD),mechanically edged/selvedged with partitions at every 1m interval and shall have minimum 10 numbersof openings per meter of mesh perpendicular to twist, tying with lacing wire of diameter2.2/3.2mm(ID/OD), supplied @3% by weight of Gabion boxes, filled with boulders with least dimension of 200 mm, as per drawing, all complete as per directions of Engineer-in-charge						
	gabion box						
	Side protection wall near east side of river training	1.000	485.000	2.000	1.000	1.000000	970.000
		1.000	485.000	1.000	1.000	1.000000	485.000
	_do_ (west)	1.000	205.000	2.000	1.000	1.000000	410.000
		1.000	205.000	1.000	1.000	1.000000	205.000
	_do_ (west)	1.000	120.000	2.000	1.000	1.000000	240.000
		1.000	120.000	1.000	1.000	1.000000	120.000
	Basin boundary between main and leeward break water	1.000	600.000	2.000	1.000	1.000000	1200.000
		1.000	600.000	1.000	1.000	1.000000	600.000
	Basin boundary near leeward break water	1.000	300.000	2.000	1.000	1.000000	600.000
		1.000	300.000	1.000	1.000	1.000000	300.000
	Total						**5130.000**
						Total Quantity in cum	**5130.000**
1.009	OD287/2022-2023						
	Laying of geotextile filter between pitching and embankment slopes on which pitching is laid to prevent escape of the embankment material through the voids of the stone pitching / cement concrete block as well as to allow free movements of water with out creating any uplift head on the pitching (OD approved by SE NC Order no D4 /179/2016/SE dt 23.2.2017 item no E4)and in price ID no 2017/928 						
	geotextile						

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EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Side protection wall near east side of river training	1.000	485.000		3.000	1.000000	1455.000
	_do_ (west)	1.000	205.000		3.000	1.000000	615.000
	_do_ (west)	1.000	120.000		3.000	1.000000	360.000
	Basin boundary between main and leeward break water	1.000	600.000		3.000	1.000000	1800.000
	Basin boundary near leeward break water	1.000	100.000		3.000	1.000000	300.000
	Total						**4530.000**
						Total Quantity in sqm	**4530.000**
1.010	4.1.6						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)						
	cement concrete						
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.800	0.200		11.200
	from entrance gate to lee ward breakwater	1.000	440.000	0.800	0.200		70.400
	Total						**81.600**
						Total Quantity in cum	**81.600**
1.011	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	coping						

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.350	0.075		1.838
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.350	0.075/2		0.919
	from entrance gate to lee ward breakwater	1.000	440.000	0.350	0.075		11.550
	from entrance gate to lee ward breakwater	1.000	440.000	0.350	0.075/2		5.775
	sideprotectioneast of river training work	1.000	485.000	0.350	0.075	1.000000	12.731
	sideprotectioneast of river training work	1.000	485.000	0.350	0.075/2	1.000000	6.366
	Butress wall at 3.6 m intervals	276.000	0.550	0.550	0.075	1.000000	6.262
	Butress wall at 3.6 m intervals	276.000	0.550	0.550	0.075/2	1.000000	3.131
	Total						**48.572**
	belt over gabion box						
	sideprotectioneast of river training work	1.000	485.000	1.000	0.150	1.000000	72.750
	do west	1.000	205.000	1.000	0.150	1.000000	30.750
	do	1.000	120.000	1.000	0.150	1.000000	18.000
	basin boundary between main and leeward	1.000	600.000	1.000	0.150	1.000000	90.000
	near leeward breakwater	1.000	300.000	1.000	0.150	1.000000	45.000
	Total						**256.500**
						Total Quantity in cum	**305.072**
1.012	5.34.1						

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	coping						
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.350	0.075		1.838
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.350	0.075/2		0.919
	from entrance gate to lee ward breakwater	1.000	440.000	0.350	0.075		11.550
	from entrance gate to lee ward breakwater	1.000	440.000	0.350	0.075/2		5.775
	sideprotectioneast of river training work	1.000	485.000	0.350	0.075	1.000000	12.731
	sideprotectioneast of river training work	1.000	485.000	0.350	0.075/2	1.000000	6.366
	Butress wall at 3.6 m intervals	276.000	0.550	0.550	0.075	1.000000	6.262
	Butress wall at 3.6 m intervals	276.000	0.550	0.550	0.075/2	1.000000	3.131
	Total						**48.572**
	belt over gabion box						
	sideprotectioneast of river training work	1.000	485.000	1.000	0.150	1.000000	72.750
	do west	1.000	205.000	1.000	0.150	1.000000	30.750
	do	1.000	120.000	1.000	0.150	1.000000	18.000
	basin boundary between main and leeward	1.000	600.000	1.000	0.150	1.000000	90.000
	near leeward breakwater	1.000	300.000	1.000	0.150	1.000000	45.000
	Total						**256.500**

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**305.072**
1.013	4.3.1						
	Centering and shuttering including strutting, propping etc. and removal of form work for:Foundations, footings, bases for columns						
	shuttering work						
	sideprotectioneast of river training work	2.000	485.000		0.150	1.000000	145.500
	do west	2.000	205.000		0.150	1.000000	61.500
	do	2.000	120.000		0.150	1.000000	36.000
	basin boundary between main and leeward	2.000	600.000		0.150	1.000000	180.000
	near leeward breakwater	2.000	300.000		0.150	1.000000	90.000
	Total						**513.000**
	for coping						
	for compound wall over land ,from auction hall area to entrance gate	2.000	70.000		0.150		21.000
	from entrance gate to lee ward breakwater	2.000	440.000		0.150		132.000
	sideprotectioneast of river training work	2.000	485.000		0.150	1.000000	145.500
	Butress wall at 3.6 m intervals	276.000	0.550		0.150	1.000000	22.770
	Total						**321.270**
						Total Quantity in sqm	**834.270**
1.014	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	RR						
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.600	0.600		25.200

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.450	0.450		14.175
	from entrance gate to lee ward breakwater	1.000	440.000	0.600	0.600		158.400
	for compound wall over land ,from auction hall area to entrance gate	1.000	440.000	0.450	0.450		89.100
	side protection east of river training work	1.000	485.000	0.450	0.450	1.000000	98.213
	do west	1.000	205.000	0.450	0.450	1.000000	41.513
	do	1.000	120.000	0.450	0.450	1.000000	24.300
	basin boundary between main and leeward	1.000	600.000	0.450	0.450	1.000000	121.500
	near leeward breakwater	1.000	100.000	0.450	0.450	1.000000	20.250
	Total						**592.651**
						Total Quantity in cum	**592.651**
1.015	OD288/2022-2023						
	Laterate masonry with neatly dressed laterate stone of size 30x20x20cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc. 						
	laterite masonry						
		1.000					1.000
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.200	1.500		21.000
	from entrance gate to lee ward breakwater	1.000	440.000	0.200	1.500		132.000
	sideprotectioneast of river training work	1.000	485.000	0.200	1.500	1.000000	145.500
	Butress wall at 3.6 m intervals	276.000	0.350	0.150	1.500	1.000000	21.735

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**321.235**
						Total Quantity in cum	**321.235**
1.016	OD5538/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - HCR						
	Steel						
	LS Wt taken as 40kg/m3 for item no 11	1.000	48.572			40.000000	1942.880
	LS Wt taken as 60kg/m3 for item no 11 belt	1.000	256.500			60.000000	15390.000
	Total						**17332.880**
						Total Quantity in kilogram	**17332.880**
1.017	13.1.2						
	12 mm cement plaster of mix:1:6 (1 cement : 6 fine sand).						
	plastering						
	for compound wall over land ,from auction hall area to entrance gate	2.000	70.000		1.500		210.000
	from entrance gate to lee ward breakwater	2.000	440.000		1.500		1320.000
	sideprotectioneast of river training work	2.000	485.000		1.500	1.000000	1455.000
	Butress wall at 3.6 m intervals	276.000	0.500		1.500	1.000000	207.000
	Total						**3192.000**
	plastering over coping						
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.750			52.500
	from entrance gate to lee ward breakwater	1.000	440.000	0.750			330.000
	sideprotectioneast of river training work	1.000	485.000	0.750		1.000000	363.750

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Butress wall at 3.6 m intervals	276.000	0.750	0.750		1.000000	155.250
	Total						**901.500**
						Total Quantity in sqm	**4093.500**
1.018	13.43.1						
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	primer						
	for compound wall over land ,from auction hall area to entrance gate	2.000	70.000		1.500		210.000
	from entrance gate to lee ward breakwater	2.000	440.000		1.500		1320.000
	sideprotectioneast of river training work	2.000	485.000		1.500	1.000000	1455.000
	Butress wall at 3.6 m intervals	276.000	0.500		1.500	1.000000	207.000
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.750			52.500
	from entrance gate to lee ward breakwater	1.000	440.000	0.750			330.000
	sideprotectioneast of river training work	1.000	485.000	0.750		1.000000	363.750
	Butress wall at 3.6 m intervals	276.000	0.750	0.750		1.000000	155.250
	Total						**4093.500**
						Total Quantity in sqm	**4093.500**
1.019	13.44.1						
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)						
	painting						
	for compound wall over land ,from auction hall area to entrance gate	2.000	70.000		1.500		210.000

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	from entrance gate to lee ward breakwater	2.000	440.000		1.500		1320.000
	sideprotectioneast of river training work	2.000	485.000		1.500	1.000000	1455.000
	Butress wall at 3.6 m intervals	276.000	0.500		1.500	1.000000	207.000
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.750			52.500
	from entrance gate to lee ward breakwater	1.000	440.000	0.750			330.000
	sideprotectioneast of river training work	1.000	485.000	0.750		1.000000	363.750
	Butress wall at 3.6 m intervals	276.000	0.750	0.750		1.000000	155.250
	Total						**4093.500**
						Total Quantity in sqm	**4093.500**

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasargod District- Construction of Gate and Gate House-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Gate and Gate house**			
1.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	50.000cum	@210.02/cum	10501.00
1.002	2.26.1			
	Extra for every additional lift 1.5 m or part there of in excavation / banking excavated or stacked materials.All kinds of soil			
	Net Total	2.250cum	@104.39/cum	234.88
1.003	2.16.1			
	Close timbering in trenches including strutting, shoring and packing cavities (wherever required) complete (Measurements to be taken of the face area timbered).Depth not exceeding 1.5m			
	Net Total	18.000sqm	@150.11/sqm	2701.98
1.004	OD1742/2022-2023			
	Bailing out water Using 5HP Pump- Bailing out water with 5HP engine and pump set including conveyance to site and erection, cost of fuel, lubrication oil and other stores, pay of staff etc complete			
	Net Total	50.000hour	@372.81/hour	18640.50
1.005	60.7.2			
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.			
	Net Total	10.000cum	@2557.65/cum	25576.50
1.006	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	20.000cum	@6687.21/cum	133744.20
1.007	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	15.000cum	@7069.78/cum	106046.70
1.008	OD308/2022-2023			
	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. All work upto plinth level 			
	Net Total	3.676cum	@9317.74/cum	34252.01
1.009	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	11.040sqm	@329.03/sqm	3632.49
1.010	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	35.040sqm	@847.44/sqm	29694.30
1.011	OD309/2022-2023			
	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. All work above plinth level upto floor V level 			
	Net Total	12.071cum	@10938.91/cum	132043.58
1.012	5.22.6			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - Mechanically Treated bars of grade Fe-500D or more			
	Net Total	313.520kilogram	@96.46/kilogram	30242.14
1.013	5.22A.6			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - Mechanically Treated bars of grade Fe-500D or more			
	Net Total	1509.740kg	@96.46/kg	145629.52
1.014	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	51.388sqm	@637.63/sqm	32766.53
1.015	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	36.476sqm	@800.47/sqm	29197.94
1.016	5.9.16.1			
	Centering and shuttering including strutting, etc. and removal of form for: Edges of slabs and breaks in floors and wallsUnder 20 cm wide			
	Net Total	63.600metre	@200.11/metre	12727.00
1.017	50.6.1.5			
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x20cm or nearest available size confirming to IS 2185 Part I of 1979 for super structure up to floor two level thickness 20cm and above in: CM 1:6 (1 cement : 6 coarse sand) etc complete			
	Net Total	10.488cum	@6580.80/cum	69019.43
1.018	9.48.2			
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc			
	Net Total	86.725kg	@211.94/kg	18380.50
1.019	9.117.2			
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 42x50 mm			
	Net Total	10.400metre	@308.89/metre	3212.46
1.020	9.118.1			
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).			

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	4.200sqm	@2033.68/sqm	8541.46
1.021	5.23			
	Smooth finishing of the exposed surface of RCC work with 6mm thick cement mortar 1:3 (cement : 3 fine sand).			
	Net Total	136.364sqm	@262.57/sqm	35805.10
1.022	13.1.1			
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	66.000sqm	@308.22/sqm	20342.52
1.023	11.41.2			
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.			
	Net Total	15.440sqm	@1733.20/sqm	26760.61
1.024	13.48.1			
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm			
	Net Total	85.676sqm	@164.22/sqm	14069.71
1.025	13.47.1			
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)			
	Net Total	137.736sqm	@186.15/sqm	25639.56
1.026	13.52.1			
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work			
	Net Total	30.880sqm	@219.17/sqm	6767.97
1.027	9.97.2			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:250x10 mm			
	Net Total	2.000no	@119.63/no	239.26
1.028	9.100.2			
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm			
	Net Total	2.000no	@61.02/no	122.04

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
1.029	12.47.1			
	Providing & fixing UV stabilised fibre glass reinforced plastic sheet rooting up to any pitch, including fixing with polymer coated 'J' or 'L' hooks, bolts & nuts 8 mm dia G.I plain/ bitumen washers complete but excluding the cost of purlins, rafters, trusses etc. The sheets shall be manufactured out of 2400 TEX panel rovings incorporating minimum 0.3% ultra-violet stabiliser in resin system under approxirnately 2400 psi and hot cured. They shall be of uniform pigmentation and thickness without air pockets and shall conform to IS 10192 and IS 12866. The sheets shall be opaque or translucent, clear or pigmented, textured or smooth as specified.2 mm thick corrugate 2.5"or 4.2" or 6") or step-down (2' or 3" or 6") as specified.			
	Net Total	15.428sqm	@1265.03/sqm	19516.88
1.030	10.25.2			
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works			
	Net Total	128.339kg	@151.29/kg	19416.41
1.031	21.1.1.3			
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionPolyester powder coated aluminium (minimum thickness of polyester powder coating 50 micron)			
	Net Total	69.972kg	@536.75/kg	37557.47
1.032	21.1.2.3			
	For shutters of doors, windows & ventilators including providing and fixing hinges / pivots and making provision for fixing of fittings wherever required including the cost of EPDM rubber/ neoprene gasket required (Fittings shall be paid for separately)Polyester powder coated aluminium (minimum thickness of polyester powder coating 50 micorn)			
	Net Total	83.116kg	@641.01/kg	53278.19
1.033	21.3.1			
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 4.0 mm thickness			

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	7.110sqm	@1154.59/sqm	8209.13
1.034	8.2.2.2			
	Providing and fixing 18 mm thick gang saw cut, mirror, polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations, of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.Area of slab over 0.50 sqm			
	Net Total	71.625sqm	@4629.02/sqm	331553.56
			Heading Total(Rs)	1446063.53
			Total Estimation PAC	1446063.53
3	**Extra Charges**			
2.001	Provision for GST			
		1446063.53	18.00%	260291.44
			Grand Total	1706354.97
			Round off	93645.03
			Rounded Total(Rs)	1800000.00
	Rupees Eighteen Lakh			

ePLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasargod District- Construction of Gate and Gate House-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Gate and Gate house						
1.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	gate & gate house						
	For main pillars	2.000	1.500	1.500	2.000		9.000
	For side pillars	2.000	1.200	1.200	1.500		4.320
	For walls	2.000	10.400	0.900	1.100		20.592
	Steps	2.000	2.800	0.450	0.300		0.756
	Wicket gate	2.000	3.140	(.9*.9)/4	0.300		0.382
	Building floor (All round)	2.000	17.200	1.500	0.150		7.740
	Gate portion	1.000	4.000	5.800	0.150		3.480
	rounding	1.000	3.730				3.730
	Total						**50.000**
						Total Quantity in cum	**50.000**
1.002	2.26.1						
	Extra for every additional lift 1.5 m or part there of in excavation / banking excavated or stacked materials.All kinds of soil						
	gate house						
	For main pillars	2.000	1.500	1.500	0.500		2.250
	Total						**2.250**
						Total Quantity in cum	**2.250**
1.003	2.16.1						
	Close timbering in trenches including strutting, shoring and packing cavities (wherever required) complete (Measurements to be taken of the face area timbered).Depth not exceeding 1.5m						
	gate house						
	For main pillars	2.000	6.000		1.500		18.000
	Total						**18.000**
						Total Quantity in sqm	**18.000**
1.004	OD1742/2022-2023						

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Bailing out water Using 5HP Pump- Bailing out water with 5HP engine and pump set including conveyance to site and erection, cost of fuel, lubrication oil and other stores, pay of staff etc complete						
	For Gate and Gate House						
	Pumping required for 10 hrs with 5 hp pump set	5.000	10.000			1.000000	50.000
	Total						**50.000**
						Total Quantity in hour	**50.000**
1.005	60.7.2						
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.						
	Gate and gate house						
	For main pillars	2.000	1.500	1.500	0.300		1.350
	For side pillars	2.000	1.200	1.200	0.300		0.864
	For walls	2.000	10.400	0.900	0.300		5.616
	Steps	2.000	2.800	0.450	0.200		0.504
	rounding	1.000	1.666				1.666
	Total						**10.000**
						Total Quantity in cum	**10.000**
1.006	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	pcc						
	For main pillars	2.000	1.500	1.500	0.150		0.675
	For side pillars	2.000	1.200	1.200	0.150		0.432
	For walls	2.000	10.400	0.900	0.150		2.808
	Steps	2.000	2.800	0.450	0.100		0.252
	room inside	2.000	2.400	2.400	0.120		1.382
	Wicket gate	2.000	3.140	(.9*.9)/4	0.300		0.382
	Building floor (All round)	2.000	17.200	1.500	0.150		7.740
	Gate portion	1.000	4.000	5.800	0.150		3.480
	rounding	1.000	2.849				2.849
	Total						**20.000**
						Total Quantity in cum	**20.000**
1.007	7.1.1						

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	gate house						
	For walls-Foundation	2.000	10.400	0.600	0.600		7.488
	For walls-Basement	2.000	10.400	0.450	0.450		4.212
	Steps	2.000	2.800	0.450	0.200		0.504
	rounding	1.000	2.796				2.796
	Total						**15.000**
						Total Quantity in cum	**15.000**
1.008	OD308/2022-2023						
	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. All work upto plinth level 						
	Column Footing of Gate House						
	For main pillars	2.000	1.500	1.500	0.200		0.900
	For side pillars	2.000	1.200	1.200	0.200		0.576
	For main pillars - f r u s t u m 0 . 4 / 3 (A 1 + A 2) + s q . r o o t of(A1xA2) = A1 = 1.5x1.5 = 2.25, A2 = 1x0.40 = 0.40 = sq.root (A1xA2) = sq.root(2.25 x 0.40) = 0 . 9 5 2x0.4/3x(2.25+0.4+0.9 5)=0.96	2.000	0.133	3.600			0.958
	For main pillars	2.000	0.900	0.300	0.950		0.513
	For side pillars	2.000	0.900	0.300	0.450		0.243
	Total						**3.190**
	Columns upto plinth level						
	For main pillars	2.000	0.900	0.300	0.450		0.243
	For side pillars	2.000	0.900	0.300	0.450		0.243

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**0.486**
						Total Quantity in cum	**3.676**
1.009	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	gate house column footing						
	For main pillars	2.000	(0.9+0.3) *2		0.950		4.560
	For side pillars	2.000	(0.9+0.3) *2		0.450		2.160
	Total						**6.720**
	Gate (Columns upto plinth level)						
	For main pillars	2.000	(.9+.3)*2		0.450		2.160
	For side pillars	2.000	(.9+.3)*2		0.450		2.160
	Total						**4.320**
						Total Quantity in sqm	**11.040**
1.010	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	For column above plinth level						
	Upto roof slab	2.000	2.400		4.250		20.400
	Top portion of Pillar	2.000	4.000		0.300		2.400
	For side pillars	2.000	2.400		2.550		12.240
	Total						**35.040**
						Total Quantity in sqm	**35.040**
1.011	OD309/2022-2023						
	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. All work above plinth level upto floor V level 						
	lintel						
	lintel over wall	2.000	10.400	0.200	0.150		0.624
	Total						**0.624**
	Roof slab						
	Sloped roof	2*2	3.700	2.180	0.100		3.226
	Parallel portion	2*2	0.900	1.170	0.100		0.421

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**3.647**
	Purgola						
	Purgola	4.000	7.400	0.200	0.600		3.552
	Purgola	5*3	0.200	0.300	0.300		0.270
	Total						**3.822**
	For column above plinth level						
	Upto roof slab	2.000	0.900	0.300	4.250		2.295
	Top portion of Pillar	2.000	1.700	0.300	0.300		0.306
	For side pillars	2.000	0.900	0.300	2.550		1.377
	Total						**3.978**
						Total Quantity in cum	**12.071**
1.012	5.22.6						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - Mechanically Treated bars of grade Fe-500D or more						
	steel						
	Column footing of gate house @ 80kg per m3	1.000	3.190			80.000000	255.200
	For column up to plinth level @ 120kg/m3 for item No.8	1.000	0.486			120.000000	58.320
	Total						**313.520**
						Total Quantity in kilogram	**313.520**
1.013	5.22A.6						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - Mechanically Treated bars of grade Fe-500D or more						
	Steel						
	For column above plinth level @ 160kg/m3	1.000	3.978			160.000000	636.480
	Lintel over wall @ 80kg/m3	1.000	0.624			80.000000	49.920
	Roof slab @100kg/m3	1.000	3.647			100.000000	364.700
	Purgolas @ 120kg/m3	1.000	3.822			120.000000	458.640
	Total						**1509.740**

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in kg	**1509.740**
1.014	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	lintel						
	lintel over wall	2.000	10.280			0.300000	6.168
	Total						**6.168**
	Purgola						
	Purgola	4.000	7.400	1.400			41.440
		7*3	0.200	0.900			3.780
	Total						**45.220**
						Total Quantity in sqm	**51.388**
1.015	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Roof slab						
	Sloped roof	2*2	3.700	2.180			32.264
	Parallel portion	2*2	0.900	1.170			4.212
	Total						**36.476**
						Total Quantity in sqm	**36.476**
1.016	5.9.16.1						
	Centering and shuttering including strutting, etc. and removal of form for: Edges of slabs and breaks in floors and wallsUnder 20 cm wide						
	Roof slab edge						
	Sloped roof	2*2	(3.700+2.18)*2				47.040
	Parallel portion	2*2	(.9+1.17)*2				16.560
	Total						**63.600**
						Total Quantity in metre	**63.600**
1.017	50.6.1.5						
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x20cm or nearest available size confirming to IS 2185 Part I of 1979 for super structure up to floor two level thickness 20cm and above in: CM 1:6 (1 cement : 6 coarse sand) etc complete						
	gate house						
	Super structure	2.000	10.400	0.200	3.000		12.480
	Total						**12.480**
	deductions						

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Doors	-2.000	1.000	0.200	2.100		-0.840
	windows	-3.000	1.000	0.200	1.400		-0.840
	Lintel	-1.000	10.400	0.200	0.150		-0.312
	Total						**-1.992**
						Total Quantity in cum	**10.488**
1.018	9.48.2						
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc						
	Details for 1.08 sqm						
	Window W,MS bar 16mm dia,1.58kg/m	2.000	1.000	1.400		15.231000	42.647
	Front gate,M.S. flat 2 5 x 3 . 1 5 m m , @ 0 . 6 3 k g / m	1.000	7.000	1.700		3.704000	44.078
	Total						**86.725**
						Total Quantity in kg	**86.725**
1.019	9.117.2						
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 42x50 mm						
	door						
	D	2.000	5.200				10.400
	Total						**10.400**
						Total Quantity in metre	**10.400**
1.020	9.118.1						

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).						
	Door						
	D	2.000	1.000		2.100		4.200
	Total						**4.200**
						Total Quantity in sqm	**4.200**
1.021	5.23						
	Smooth finishing of the exposed surface of RCC work with 6mm thick cement mortar 1:3 (cement : 3 fine sand).						
	Purgola						
	Purgola	4.000	7.000	1.600			44.800
	Purgola	5*3	0.200	1.200			3.600
	Total						**48.400**
	pillars						
	For side pillars	2.000	2.400	2.550			12.240
	For main pillar Top	2.000	1.700	0.300			1.020
	-d0- head	2.000	4.000	0.300			2.400
	For main pillars	2.000	2.400	4.250			20.400
	Total						**36.060**
	ceiling						
	ceiling	1.000	7.600	2.030			15.428
		2*2	3.700	2.180			32.264
		2*2	0.900	1.170			4.212
	Total						**51.904**
						Total Quantity in sqm	**136.364**
1.022	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	plastering						

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	inside wall	2.000	9.600		3.000		57.600
	Outer wall (remaining granite portion)	2.000	2.800		3.000		16.800
	Total						**74.400**
	deductions						
	door	-2.000	1.000		2.100		-4.200
	window	-3.000	1.000		1.400		-4.200
	Total						**-8.400**
						Total Quantity in sqm	**66.000**
1.023	11.41.2						
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.						
	flooring						
	room-floor	2.000	2.400	2.400			11.520
	steps	2.000	2.800	0.700			3.920
	Total						**15.440**
						Total Quantity in sqm	**15.440**
1.024	13.48.1						
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm						
	Gate house and roof (inside)						
	Inside wall	2.000	9.600	3.000			57.600
	Sloped roof (inside)	2*2	3.700	2.180			32.264
	Parallelportion(inside)	4.000	0.900	1.170			4.212
	Total						**94.076**
	deductions						
	Door	-2.000	1.000		2.100		-4.200
	window	-3.000	1.000		1.400		-4.200
	Total						**-8.400**
						Total Quantity in sqm	**85.676**
1.025	13.47.1						

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)						
	outer side						
	Outer Wall (remaining granite portion)	2.000	2.800	3.000			16.800
	Purgolas	4.000	7.000	1.600			44.800
		5*3	0.200	1.200			3.600
	Total						**65.200**
	Pillars						
	For side pillars	2.000	2.400	2.550			12.240
	For main pillar Top	2.000	1.700	0.300			1.020
	-d0- head	2.000	4.000	0.300			2.400
	For main pillars	2.000	2.400	4.250			20.400
	Total						**36.060**
	roof						
	sloped roof(out side)	2*2	3.700	2.180			32.264
		2*2	0.900	1.170			4.212
	Total						**36.476**
						Total Quantity in sqm	**137.736**
1.026	13.52.1						
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work						
	painting						
	window	3.000	1.000	1.400			4.200
	Front gate	2.000	7.000	1.700			23.800
	Wicket gate	2*4	0.400	0.900			2.880
	Total						**30.880**
						Total Quantity in sqm	**30.880**
1.027	9.97.2						
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:250x10 mm						
	250x10mm tower bolt						
		2.000					2.000
	Total						**2.000**

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in no	**2.000**
1.028	9.100.2						
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm						
	Al handle 100mm with plate 150mm x32mm						
		2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.029	12.47.1						
	Providing & fixing UV stabilised fibre glass reinforced plastic sheet rooting up to any pitch, including fixing with polymer coated 'J' or 'L' hooks, bolts & nuts 8 mm dia G.I plain/ bitumen washers complete but excluding the cost of purlins, rafters, trusses etc. The sheets shall be manufactured out of 2400 TEX panel rovings incorporating minimum 0.3% ultra-violet stabiliser in resin system under approxirnately 2400 psi and hot cured. They shall be of uniform pigmentation and thickness without air pockets and shall conform to IS 10192 and IS 12866. The sheets shall be opaque or translucent, clear or pigmented, textured or smooth as specified.2 mm thick corrugate 2.5"or 4.2" or 6") or step-down (2' or 3" or 6") as specified.						
	Details of cost for area of roof 2x18.09x5.1 = 184.518 sqm						
	Purgola roof	1.000	7.600	2.030			15.428
	Total						**15.428**
						Total Quantity in sqm	**15.428**
1.030	10.25.2						
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works						
	gate						
	Front gate - 33.6@ (14.5+.084)/2 kg/m	2.000	7.000		(14.5+.084)/2		102.088
	Wicket gate	4.000	0.900		(14.5+.084)/2		26.251
	Total						**128.339**
						Total Quantity in kg	**128.339**
1.031	21.1.1.3						

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionPolyester powder coated aluminium (minimum thickness of polyester powder coating 50 micron)						
	Aluminium work						
	Door D-Weight @ 8.33kg/m2	2.000	1.000	2.100	8.330		34.986
	Al window	3.000	1.000	1.400	8.330		34.986
	Total						**69.972**
						Total Quantity in kg	**69.972**
1.032	21.1.2.3						
	For shutters of doors, windows & ventilators including providing and fixing hinges / pivots and making provision for fixing of fittings wherever required including the cost of EPDM rubber/ neoprene gasket required (Fittings shall be paid for separately)Polyester powder coated aluminium (minimum thickness of polyester powder coating 50 micorn)						
	shutters						
	Door D Weight @ 11.69kg/m	2.000	0.900	2.000	11.690		42.084
	Area of aluminium windows @11.69 kg/m	3.000	0.900	1.300	11.690		41.032
	Total						**83.116**
						Total Quantity in kg	**83.116**
1.033	21.3.1						
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 4.0 mm thickness						
	shutters						
	Area of aluminium door shutters	2.000	0.900	2.000			3.600
	Area of aluminium window shutters	3.000	0.900	1.300			3.510

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**7.110**
						Total Quantity in sqm	**7.110**
1.034	8.2.2.2						
	Providing and fixing 18 mm thick gang saw cut, mirror, polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations, of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.Area of slab over 0.50 sqm						
	gate house						
	Out side walls of ATM counter	3.000	2.800	3.000			25.200
	Out side walls of toll booth	3.000	2.800	3.000			25.200
	Compound wall front	2.000	10.000	1.200			24.000
	Name board	1.000	7.500	0.750			5.625
	Total						**80.025**
	deductions						
	Door	-2.000	1.000		2.100		-4.200
	window	-3.000	1.000		1.400		-4.200
	Total						**-8.400**
						Total Quantity in sqm	**71.625**

EST No. :HED/CEHED/EST/105/2022_5_3_6 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Construction of Internal Road, Parking area and Drainage facility-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Concrete road & drainage work**			
1.001	3.15.2			
	Compacting Original Ground (ii) Compacting original ground supporting subgrade Loosening of the ground upto a level of 300 mm below the subgrade level, watered, graded and compacted in layers to meet requirement of Tables 300.1 and 300.2 for subgrade construction as per Technical Specification Clause 303.5.2.			
	Net Total	3270.000cum	@62.02/cum	202805.40
1.002	3.2			
	Preparation of Foundation for Embankment Scarifying Existing Bituminous Surface to a Depth of 150 mm by Mechanical Means Scarifying the existing bituminous road surface to a depth of 150 mm and disposal of scarified material with a lift upto 3 m and lead upto 1000 m as per Technical Specification Clause 301.4.			
	Net Total	1200.000sqm	@9.63/sqm	11556.00
1.003	11.1.1.1			
	Excavation for Structures Earthwork in excavation for structures as per drawing and technical specifications Clause 305.1 including setting out, construction of shoring and bracing, removal of stumps and other deleterious material and disposal upto a lead of 50 m, dressing of sides and bottom and backfilling in trenches with excavated suitable material. I. Ordinary soil (i) Upto 3 m depth			
	Net Total	275.400cum	@750.44/cum	206671.18
1.004	3.4			
	Construction of Embankment with Material Obtained from Borrow Pits Construction of embankment with approved material obtained from borrow pits with a lift upto 1.5 m, transporting to site, spreading, grading to required slope and compacting to meet requirement of Tables 300.1 and 300.2 with a lead upto 1000 m as per Technical Specification Clause 301.5			
	Net Total	1716.800cum	@463.32/cum	795427.78
1.005	4.1.A.1			
	Granular Sub-base with Well Graded Material (Table 400.1) (A) By Mix in Place Method Construction of granular sub-base by providing well graded material, spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC, and compacting with smooth wheel roller to achieve the desired density, complete as per Technical Specification Clause 401. (i) For Grading I Material			
	Net Total	1092.000cum	@2917.23/cum	3185615.16
1.006	11.4.1.1			
	Providing concrete for plain/reinforced concrete in open foundations complete as per			

File No. HECE/207/2022-DR8 (Computer No. 19397)

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EST No. :HED/CEHED/EST/105/2022_5_3_6 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	drawings and technical specifications Clause 802, 803, 1202 & 1203 I. P.C.C grade M 10 (i) Nominal mix 1:3:6			
	Net Total	717.100cum	@7646.85/cum	5483556.14
1.007	11.4.3.1			
	Providing concrete for plain/reinforced concrete in open foundations complete as per drawings and technical specifications Clause 802, 803, 1202 & 1203 III. P.C.C. grade M 20 (i) Nominal mix (1:2:4)			
	Net Total	84.200cum	@8116.64/cum	683421.09
1.008	11.4.5			
	Providing concrete for plain/reinforced concrete in open foundations complete as per drawings and technical specifications Clause 802, 803, 1202 & 1203 V. R.C.C. grade M 25			
	Net Total	650.000cum	@8861.61/cum	5760046.50
1.009	11.8			
	Supplying, fitting and placingTMT bar reinforcement in foundation complete as per drawings and technical specifications Clauses 1000 and 1202			
	Net Total	19.500tonne	@86333.07/tonne	1683494.87
1.010	4.9			
	Wet Mix Macadam Providing, laying, spreading and compacting graded stone aggregate to wet mix macadam specification including premixing the material with water at OMC in mechanical mixer (Pug Mill), carriage of mixed material by tipper to site, laying in uniform layers in sub-base/base course on a well prepared sub-base and compacting with smooth wheel roller of 80 to 100kN weight to achieve the desired density including lighting, barricading and maintenance of diversion, etc as per Tables 400.11 & 400.12 and Technical Specification Clause 406. By Mechanical Means with 1 km lead			
	Net Total	444.000cum	@3255.46/cum	1445424.24
1.011	5.1.1a			
	Prime Coat :- Low porosity Providing and applying primer coat with bitumen emulsion (SS-1) on prepared surface of granular base including cleaning of road surface and spraying primer at the rate of 0.70-1.0 kg/sqm using mechanical means as per Technical Specification Clause 502			
	Net Total	2960.000sqm	@69.68/sqm	206252.80
1.012	5.2.3a			
	Tack Coat Providing and applying tack coat with Bitumen emulsion (RS-1) using emulsion distributor at the rate of 0.25 to 0.30 kg per sqm on the prepared granular surfaces treated with primer & cleaned with Hydraulic broom as per Technical Specification Clause 503.			
	Net Total	2960.000sqm	@14.44/sqm	42742.40
			Heading Total(Rs)	19707013.56
2	**Drain**			

EST No. :HED/CEHED/EST/105/2022_5_3_6 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
2.001	13.7.1			
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	1300.000sqm	@393.71/sqm	511823.00
2.002	OD205/2022-2023			
	Laterite boulder masonry with hard departmental stone in foundation and plinth including levelling up with cement concrete 1:6:12 (one cement, six course sand , 12 graded stone aggregate 20mm nominal size),up to plinth level with cement mortar1:6 			
	Net Total	81.400cum	@4610.14/cum	375265.40
			Heading Total(Rs)	887088.40
3	**BM&BC**			
3.001	5.3.2.a			
	Providing and laying bituminous macadam with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading premixed with a bituminous binder (VG 30), transported to the site, laid over a previously prepared surface with paver finisher to the required grade, level, and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction For Grading II - (19 mm nominal size)			
	Net Total	148.000cum	@7787.76/cum	1152588.48
3.002	5.6.2.a			
	Providing and laying bituminous concrete with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with a bituminous binder(NRMB) @ 5.4 percent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level, and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 507 complete in all respects For Grading - II (13.2 mm Nominal Size)			
	Net Total	88.800cum	@12465.77/cum	1106960.38
3.003	8.13			
	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads on Bituminous Surface @ 250 gms per sqm area, the thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35. The finished surface to be level, uniform, and free from streaks and holes.			
	Net Total	148.000sqm	@494.43/sqm	73175.64
3.004	8.35			
	Providing and fixing reflective road studs (Raised Pavement Marker) of ' category A' made out of ASA/HIPS/ABS moulded body with shanks and conforming to ASTM D 4280, strong enough to support a load of more than 13.635 T when tested in accordance with ASTM D 4280, reflective panel confirming to ASTM D 788, and reflectivity conforming to clause 804.4. including installation, drilling, fixing with adhesive etc. with 2 years warranty for the road stud as well as for in field performance as per clause 804.7.3 Road Markers/Road Stud with Lense Reflector :-			

EST No. :HED/CEHED/EST/105/2022_5_3_6 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	300.000no	@195.85/no	58755.00
3.005	55.23			
	Supplying and laying interlocking tile 80mm or nearest size thickness, minimum strength M30 including providing a layer of 6mm aggregate for 5cm thickness, then laying interlock cobbles in lines and levels as per the directions of the departmental officers at site inclusive of all cost & conveyance charges etc. complete.			
	Net Total	888.000sqm	@946.36/sqm	840367.68
			Heading Total(Rs)	3231847.18
			Total Estimation PAC	23825949.14
5	**Extra Charges**			
4.001	Provision for GST			
		23825949.14	18.00%	4288670.85
			Grand Total	28114619.99
			Round off	85380.01
			Rounded Total(Rs)	28200000.00
	Rupees Two Crore Eighty Two Lakh			

PRICE
ePLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

EST No. :HED/CEHED/EST/105/2022_5_3_6 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Construction of Internal Road, Parking area and Drainage facility-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Concrete road & drainage work						
1.001	3.15.2						
	Compacting Original Ground (ii) Compacting original ground supporting subgrade Loosening of the ground upto a level of 300 mm below the subgrade level, watered, graded and compacted in layers to meet requirement of Tables 300.1 and 300.2 for subgrade construction as per Technical Specification Clause 303.5.2.						
	parking Area						
	parking Area	1.000	60.000	23.000	0.500		690.000
		1.000	70.000	42.000	0.500		1470.000
	Total						**2160.000**
	For Road						
	Main road	1.000	370.000	10.000	0.300		1110.000
	Total						**1110.000**
						Total Quantity in cum	**3270.000**
1.002	3.2						
	Preparation of Foundation for Embankment Scarifying Existing Bituminous Surface to a Depth of 150 mm by Mechanical Means Scarifying the existing bituminous road surface to a depth of 150 mm and disposal of scarified material with a lift upto 3 m and lead upto 1000 m as per Technical Specification Clause 301.4.						
	existing road						
		1.000	300.000	4.000			1200.000
	Total						**1200.000**
						Total Quantity in sqm	**1200.000**
1.003	11.1.1.1						
	Excavation for Structures Earthwork in excavation for structures as per drawing and technical specifications Clause 305.1 including setting out, construction of shoring and bracing, removal of stumps and other deleterious material and disposal upto a lead of 50 m, dressing of sides and bottom and backfilling in trenches with excavated suitable material. I. Ordinary soil (i) Upto 3 m depth						
	Drainage						
	Drain around the parking area	1.000	364.000	1.000	0.600		218.400
	Drain from parking area to river	1.000	57.000	1.000	1.000		57.000
	Total						**275.400**

EST No. :HED/CEHED/EST/105/2022_5_3_6 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**275.400**
1.004	3.4						
	Construction of Embankment with Material Obtained from Borrow Pits Construction of embankment with approved material obtained from borrow pits with a lift upto 1.5 m, transporting to site, spreading, grading to required slope and compacting to meet requirement of Tables 300.1 and 300.2 with a lead upto 1000 m as per Technical Specification Clause 301.5						
	for road						
	Main road	1.000	370.000	11.600	0.400		1716.800
	Total						**1716.800**
						Total Quantity in cum	**1716.800**
1.005	4.1.A.1						
	Granular Sub-base with Well Graded Material (Table 400.1) (A) By Mix in Place Method Construction of granular sub-base by providing well graded material, spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC, and compacting with smooth wheel roller to achieve the desired density, complete as per Technical Specification Clause 401. (i) For Grading I Material						
	parking Area						
	parking Area	1.000	60.000	23.000	0.150		207.000
		1.000	70.000	42.000	0.150		441.000
	Total						**648.000**
	for Road						
	Main road	2.000	370.000	4.000	0.150		444.000
	Total						**444.000**
						Total Quantity in cum	**1092.000**
1.006	11.4.1.1						
	Providing concrete for plain/reinforced concrete in open foundations complete as per drawings and technical specifications Clause 802, 803, 1202 & 1203 I. P.C.C grade M 10 (i) Nominal mix 1:3:6						
	Parking Area						
	parking Area	1.000	60.000	23.000	0.100		138.000
		1.000	70.000	42.000	0.100		294.000
	Total						**432.000**
	Drainage						
	Drain around the Parking area	1.000	364.000	1.000	0.150		54.600
	drain from parking area to river	1.000	57.000	1.000	0.150		8.550
	Side wall	2.000	364.000	0.250	0.500		91.000

EST No. :HED/CEHED/EST/105/2022_5_3_6 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Side wall	2.000	57.000	0.250	0.700		19.950
	Total						**174.100**
	For Road						
	Median kerb of road	2.000	370.000	0.300	0.300		66.600
	side kerb	2.000	370.000	0.300	0.200		44.400
	Total						**111.000**
						Total Quantity in cum	**717.100**
1.007	11.4.3.1						
	Providing concrete for plain/reinforced concrete in open foundations complete as per drawings and technical specifications Clause 802, 803, 1202 & 1203 III. P.C.C. grade M 20 (i) Nominal mix (1:2:4)						
	Drainage						
	Drain around the Parking area	1.000	364.000	1.000	0.050		18.200
	drain from parking area to river	1.000	57.000	1.000	0.050		2.850
	Drain around the Parking area Cover slab	1.000	364.000	1.000	0.150		54.600
	Drain from parking area to river cover slab	1.000	57.000	1.000	0.150		8.550
	Total						**84.200**
						Total Quantity in cum	**84.200**
1.008	11.4.5						
	Providing concrete for plain/reinforced concrete in open foundations complete as per drawings and technical specifications Clause 802, 803, 1202 & 1203 V. R.C.C. grade M 25						
	Parking Area						
	parking Area	1.000	60.000	23.000	0.150		207.000
		1.000	70.000	42.000	0.150		441.000
	Guard stone 15cm height 2m c/c on the side of parking area and drain	147.000	0.200	0.200	0.150		0.882
	rounding	1.000	1.118				1.118
	Total						**650.000**
						Total Quantity in cum	**650.000**
1.009	11.8						

EST No. :HED/CEHED/EST/105/2022_5_3_6 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying, fitting and placingTMT bar reinforcement in foundation complete as per drawings and technical specifications Clauses 1000 and 1202						
	steel						
	LS Wt taken as 30kg/m3 of concrete for road work	1.000	650.000			0.030000	19.500
	Total						**19.500**
						Total Quantity in tonne	**19.500**
1.010	4.9						
	Wet Mix Macadam Providing, laying, spreading and compacting graded stone aggregate to wet mix macadam specification including premixing the material with water at OMC in mechanical mixer (Pug Mill), carriage of mixed material by tipper to site, laying in uniform layers in sub-base/base course on a well prepared sub-base and compacting with smooth wheel roller of 80 to 100kN weight to achieve the desired density including lighting, barricading and maintenance of diversion, etc as per Tables 400.11 & 400.12 and Technical Specification Clause 406. By Mechanical Means with 1 km lead						
	for road						
	Main road both side	2.000	370.000	4.000	0.150		444.000
	Total						**444.000**
						Total Quantity in cum	**444.000**
1.011	5.1.1a						
	Prime Coat :- Low porosity Providing and applying primer coat with bitumen emulsion (SS-1) on prepared surface of granular base including cleaning of road surface and spraying primer at the rate of 0.70-1.0 kg/sqm using mechanical means as per Technical Specification Clause 502						
	For Road						
	Main road both side	2.000	370.000	4.000			2960.000
	Total						**2960.000**
						Total Quantity in sqm	**2960.000**
1.012	5.2.3a						
	Tack Coat Providing and applying tack coat with Bitumen emulsion (RS-1) using emulsion distributor at the rate of 0.25 to 0.30 kg per sqm on the prepared granular surfaces treated with primer & cleaned with Hydraulic broom as per Technical Specification Clause 503.						
	For Road						
	Main road both side	2.000	370.000	4.000			2960.000
	Total						**2960.000**
						Total Quantity in sqm	**2960.000**

EST No. :HED/CEHED/EST/105/2022_5_3_6 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
2	Drain						
2.001	13.7.1						
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)						
	Drainage						
	Drain around the Parking area	1.000	364.000	2.000			728.000
	drain from parking area to river	1.000	57.000	2.200			125.400
	Total						**853.400**
	For Road						
	boundary wall of road	2.000	370.000	0.600			444.000
	rounding	1.000	2.600				2.600
	Total						**446.600**
						Total Quantity in sqm	**1300.000**
2.002	OD205/2022-2023						
	Laterite boulder masonry with hard departmental stone in foundation and plinth including levelling up with cement concrete 1:6:12 (one cement, six course sand , 12 graded stone aggregate 20mm nominal size),up to plinth level with cement mortar1:6 						
	For Road						
	Boundary wall of the road	2.000	370.000	0.350	0.200		51.800
		2.000	370.000	0.200	0.200		29.600
	Total						**81.400**
						Total Quantity in cum	**81.400**
3	BM&BC						
3.001	5.3.2.a						
	Providing and laying bituminous macadam with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading premixed with a bituminous binder (VG 30), transported to the site, laid over a previously prepared surface with paver finisher to the required grade, level, and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction For Grading II - (19 mm nominal size)						
	Road on both sides						
		2.000	370.000	4.000	0.050		148.000
	Total						**148.000**
						Total Quantity in cum	**148.000**
3.002	5.6.2.a						

EST No. :HED/CEHED/EST/105/2022_5_3_6 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and laying bituminous concrete with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with a bituminous binder(NRMB) @ 5.4 percent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level, and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 507 complete in all respects For Grading - II (13.2 mm Nominal Size)						
	road both sides						
		2.000	370.000	4.000	0.030		88.800
	Total						**88.800**
						Total Quantity in cum	**88.800**
3.003	8.13						
	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads on Bituminous Surface @ 250 gms per sqm area, the thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35. The finished surface to be level, uniform, and free from streaks and holes.						
	line marks on sides						
		2*2	370.000	0.100			148.000
	Total						**148.000**
						Total Quantity in sqm	**148.000**
3.004	8.35						
	Providing and fixing reflective road studs (Raised Pavement Marker) of ' category A' made out of ASA/HIPS/ABS moulded body with shanks and conforming to ASTM D 4280, strong enough to support a load of more than 13.635 T when tested in accordance with ASTM D 4280, reflective panel confirming to ASTM D 788, and reflectivity conforming to clause 804.4. including installation, drilling, fixing with adhesive etc. with 2 years warranty for the road stud as well as for in field performance as per clause 804.7.3 Road Markers/Road Stud with Lense Reflector :-						
	for road sides						
	LS qty taken as 300	300.000					300.000
	Total						**300.000**
						Total Quantity in no	**300.000**
3.005	55.23						
	Supplying and laying interlocking tile 80mm or nearest size thickness, minimum strength M30 including providing a layer of 6mm aggregate for 5cm thickness, then laying interlock cobbles in lines and levels as per the directions of the departmental officers at site inclusive of all cost & conveyance charges etc. complete.						
	side berm						
		2.000	370.000	1.200			888.000
	Total						**888.000**
						Total Quantity in sqm	**888.000**

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(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of Toilet block inside the Harbour-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Toilet Block**			
1.001	2.8.1			
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil			
	Net Total	79.230cum	@291.42/cum	23089.21
1.002	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	12.912cum	@6687.21/cum	86345.26
1.003	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	43.371cum	@7069.78/cum	306623.43
1.004	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	13.495cum	@9237.20/cum	124656.01
1.005	5.34.1			
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	27.592cum	@80.55/cum	2222.54
1.006	2.25			

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Sl No	Specification	Quantity	Rate	Amount
	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m.			
	Net Total	21.577cum	@253.71/cum	5474.30
1.007	4.1.6			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)			
	Net Total	5.524cum	@7076.05/cum	39088.10
1.008	50.6.7.2			
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.			
	Net Total	31.496cum	@7872.96/cum	247966.75
1.009	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	14.097cum	@10858.36/cum	153070.30
1.010	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	25.200sqm	@329.03/sqm	8291.56
1.011	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	89.860sqm	@637.63/sqm	57297.43
1.012	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	75.135sqm	@800.47/sqm	60143.31
1.013	OD5549/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo -HCR			
	Net Total	2207.360kilogram	@96.62/kilogram	213275.12

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Sl No	Specification	Quantity	Rate	Amount
1.014	13.1.1			
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	273.580sqm	@308.22/sqm	84322.83
1.015	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	87.550sqm	@262.57/sqm	22988.00
1.016	13.43.1			
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer			
	Net Total	155.580sqm	@69.33/sqm	10786.36
1.017	13.83.2			
	Wall painting with premium acrylic emulsion paint of interior grade, having VOC (Volatile including applying additional coats wherever required to achieve even shade and colour.Two coats			
	Net Total	146.880sqm	@131.59/sqm	19327.94
1.018	13.47.1			
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)			
	Net Total	99.830sqm	@186.15/sqm	18583.35
1.019	11.46.1			
	Providing and laying Vitrified tiles indifferent sizes (thickness to be specified by manufacturer), with water absorption less than 0.08 % and conforming to I.S. 15622, of approved make, in all colours & shade, in skirting, riser of steps, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand), including grouting the joint with white cement & matching pigments etc. complete.Size of Tile 500x500 mm			
	Net Total	112.930sqm	@1516.68/sqm	171278.67
1.020	50.9.1.1			
	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately), using good quality Anjili wood /jack wood			
	Net Total	0.187cum	@109412.10/cum	20460.06
1.021	50.9.3.1			
	Providing and fixing paneled or paneled and glazed shutters for doors, windows and clerestory windows, 30 mm thick shutters including ISI marked M.S. pressed butt hinges bright finished of required size with necessary screws, excluding paneling which will be paid for separately, all complete as per direction 0f Engineer in- charge. using Anjili/ Jack wood			
	Net Total	5.071sqm	@3002.91/sqm	15227.76
1.022	50.9.4.1			

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Sl No	Specification	Quantity	Rate	Amount
	Providing and fixing paneling or paneling and glazing in paneled or paneled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured) paneling for paneled or paneled and glazed shutters 25 mm to 40 mm thick using good quality Anjili/ Jack wood			
	Net Total	0.986sqm	@2725.35/sqm	2687.20
1.023	50.9.5.1			
	Providing and fixing glazed shutters for doors, windows and clerestory windows using 4 mm thick float glass panes including ISI marked M.S pressed butt hinges bright finished of required size with necessary screws. Using Anjili wood/ jack wood 35 mm thick shutters.			
	Net Total	3.280sqm	@3924.72/sqm	12873.08
1.024	9.48.2			
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc			
	Net Total	44.100kg	@211.94/kg	9346.55
1.025	9.53			
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	10.000each	@207.00/each	2070.00
1.026	9.117.2			
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 42x50 mm			
	Net Total	20.000metre	@308.89/metre	6177.80
1.027	9.118.1			
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and			

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Sl No	Specification	Quantity	Rate	Amount
	fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).			
	Net Total	6.720sqm	@2033.68/sqm	13666.33
1.028	50.9.15.1			
	Supplying and fixing 200 mm Aluminium aldrop			
	Net Total	5.000no	@171.51/no	857.55
1.029	9.63.3			
	Providing and fixing ISI marked oxidised M.S. tower bolt black finish, (Barrel type) with necessary screws etc. complete:150x10 mm			
	Net Total	5.000no	@60.70/no	303.50
1.030	14.35.3			
	Providing and fixing finished brass hard drawn hooks and eyes:200 mm			
	Net Total	14.000no	@85.95/no	1203.30
1.031	14.35.5			
	Providing and fixing finished brass hard drawn hooks and eyes:100 mm			
	Net Total	11.000no	@60.44/no	664.84
1.032	9.66.1			
	Providing and fixing ISI marked oxidised M.S. handles conforming to IS : 4992 with necessary screws etc. complete:125 mm			
	Net Total	1.000no	@40.27/no	40.27
1.033	13.85.1			
	Applying priming coats with primer of approved brand and manufacture, having low VOC (Volatile Organic Compound) content.With ready mixed pink or grey primer on wood work (hard and soft wood) having VOC content less than 50 grams/ litre			
	Net Total	12.516sqm	@65.91/sqm	824.93
1.034	13.61.1			
	Painting with synthetic enamel paint of approved brand and manufacture to give an even shade:Two or more coats on new work			
	Net Total	11.318sqm	@140.37/sqm	1588.71
1.035	13.52.1			
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work			
	Net Total	13.945sqm	@219.17/sqm	3056.33
1.036	17.3.2			
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.c. pan with ISI marked black solid plastic seat			

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Sl No	Specification	Quantity	Rate	Amount
	and lid			
	Net Total	4.000each	@7582.40/each	30329.60
1.037	50.17.1.4			
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.			
	Net Total	4.000no	@758.07/no	3032.28
1.038	17.4.1			
	Providing and fixing white vitreous china flat back or wall corner type lipped front urinal basin of 430x260x350 mm and 340x410x265 mm sizes respectively with automatic flushing cistern with standard flush pipe and C.P. brass spreaders with brass unions and G.I. clamps complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required:One urinal basin with 5 litre white P.V.C. automatic flushing cistern			
	Net Total	4.000each	@5754.71/each	23018.84
1.039	17.7.2			
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 630 x 450 mm with a single 15 mm C.P. brass pillar tap			
	Net Total	6.000each	@3177.85/each	19067.10
1.040	18.48			
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.			
	Net Total	3000.000Litre	@10.18/Litre	30540.00
1.041	50.18.9.9.2			
	Providing and fixing PVC pipes includes joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in CHarge. 110 mm dia 4 Kg/cm2			
	Net Total	50.000metre	@471.14/metre	23557.00
1.042	50.18.9.7.2			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge.63 mm dia 4 Kgf/cm2			
	Net Total	50.000metre	@300.47/metre	15023.50
1.043	50.18.7.4.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 10Kgf/cm2- Internal work - Exposed on wall			
	Net Total	150.000metre	@313.08/metre	46962.00

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Sl No	Specification	Quantity	Rate	Amount
1.044	50.18.8.3.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 25 mm pipe 10kgf /cm2			
	Net Total	150.000metre	@414.35/metre	62152.50
1.045	50.18.9.20.3			
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 63 mm dia Door Elbow			
	Net Total	6.000no	@79.76/no	478.56
1.046	50.18.9.22.3			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement-110 mm dia Door Elbow			
	Net Total	4.000no	@131.22/no	524.88
1.047	50.18.9.22.4			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement- 110 mm dia Bend			
	Net Total	4.000no	@160.26/no	641.04
1.048	50.18.9.22.6			
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 110x110x110 mm dia Door tee			
	Net Total	4.000no	@186.75/no	747.00
1.049	50.17.1.1			
	Supplying and fixing Stainless steel soap dish including cost of materials and labour charges etc complete as per the direction of site Engineer-in-charge.			
	Net Total	10.000no	@66.98/no	669.80
1.050	50.17.1.3			
	Supplying and fixing CP Towel rod 60cm or nearest available length including cost of materials and labour charges etc complete as per the direction of site Engineer-in-charge.			
	Net Total	6.000no	@128.14/no	768.84
1.051	50.18.9.21.7			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Vent cowl			
	Net Total	4.000no	@86.15/no	344.60
1.052	18.58.1.1			
	Providing and fixing PTMT grating of approved quality and colour. Circular type100 mm nominal dia			
	Net Total	10.000each	@43.76/each	437.60
1.053	19.4.1.1			
	Providing and fixing square-mouth S.W. gully trap class SP -1 complete with C.I. grating brick masonry chamber with water tight C.I. cover with frame of 300x300 mm size (inside) the weight of cover to be not less than 4.50 kg and frame to be not less than 3.20 kg as per standard design: 100x100 mm size P typeWith common burnt clay F.P.S. (non modular) bricks of class designation 7.5			

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Sl No	Specification	Quantity	Rate	Amount
	Net Total	4.000each	@2664.66/each	10658.64
1.054	18.18.2			
	Providing and fixing ball valve (brass) of approved quality, High or low pressure, with plastic floats complete:20 mm nominal bore			
	Net Total	5.000each	@446.34/each	2231.70
1.055	18.51.1			
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore			
	Net Total	20.000each	@637.96/each	12759.20
1.056	17.31			
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.			
	Net Total	2.000each	@1481.95/each	2963.90
1.057	10.3			
	Providing and fixing in position collapsible steel shutters with vertical channels 20x10x2 mm and braced with flat iron diagonals 20x5 mm size, with top and bottom rail of T-iron 40x40x6 mm, with 40 mm dia steel pulleys, complete with bolts, nuts,locking arrangement, stoppers, handles, including applying a priming coat of approved steel primer .			
	Net Total	4.500sqm	@10014.78/sqm	45066.51
1.058	19.7.1.2			
	Constructing brick masonry manhole in cement mortar 1:4 (1 cement : 4 coarse sand) with R.C.C. top with 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size), foundation concrete 1:4:8 mix (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size,) inside plastering 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with floating coat of neat cement and making channels in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement complete as per standard design: Inside size 90x80 cm and 45 cm deep including C.I. cover with frame (light duty) 455x610 mm internal dimensions, total weight of cover and frame to be not less than 38 kg (weigh of cover 23 kg and weight of frame 15 kg):With Sewer bricks conforming to IS : 4885			
	Net Total	1.000each	@12608.11/each	12608.11
1.059	19.33			
	Constructing soak pit 1.20x1.20 m filled with brickbats including S.W. drain pipe 100 mm diameter and 1.20 m long complete as per standard design.			
	Net Total	3.000each	@3012.28/each	9036.84
1.060	19.15.1			
	Providing M.S. foot rests including fixing in manholes with 20x20x10 cm cement concrete blocks 1:3:6 (1 cement : 3 coarse sand: 6 graded stone aggregate 20 mm nominal size) as per standard design.With 20x20 mm square bar			

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Sl No	Specification	Quantity	Rate	Amount
	Net Total	1.000each	@487.68/each	487.68
1.061	10.2			
	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.			
	Net Total	117.400kg	@117.55/kg	13800.37
			Heading Total(Rs)	2113786.77
			Total Estimation PAC	2113786.77
3	**Extra Charges**			
2.001	Provision for GST			
	2113786.77		18.00%	380481.62
			Grand Total	2494268.39
			Round off	5731.61
			Rounded Total(Rs)	2500000.00
	Rupees Twenty Five Lakh			

ePRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

EST No. :HED/CEHED/EST/105/2022_5_12_11 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of Toilet block inside the Harbour-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Toilet Block						
1.001	2.8.1						
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil						
	Earthwork						
	Long wall	2.000	13.900	0.800	0.750		16.680
	Short wall	3.000	4.800	0.800	0.750		8.640
	Tank- LW	2.000	3.400	0.800	0.750		4.080
	Tank -SW	2.000	1.500	0.800	0.750		1.800
	W/C - LW	4.000	2.000	0.800	0.750		4.800
	W/C - SW	3.000	1.700	0.800	0.750		3.060
	Wash area- LW	1.000	1.900	0.800	0.750		1.140
	Wash area- SW	1.000	1.700	0.800	0.750		1.020
	Wash area- LW	1.000	1.900	0.800	0.750		1.140
	Cloak room- LW	1.000	3.300	0.800	0.750		1.980
	Cloak room- SW	1.000	1.800	0.800	0.750		1.080
	Courtyard	1.000	1.400	0.800	0.750		0.840
	Step	1.000	1.500	0.600	0.150		0.135
	Step	1.000	2.000	0.600	0.150		0.180
	Septic tank	1.000	5.500	2.100	1.500		17.325
	Soak pit	3.000	1.400	1.400	1.000		5.880
	Column	6.000	1.500	1.500	0.700		9.450
	Total						**79.230**
						Total Quantity in cum	**79.230**
1.002	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	PCC						
	Long wall	2.000	13.900	0.800	0.150		3.336
	Short wall	3.000	4.800	0.800	0.150		1.728

EST No. :HED/CEHED/EST/105/2022_5_12_11 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Tank- LW	2.000	3.400	0.800	0.150		0.816
	Tank -SW	2.000	1.500	0.800	0.150		0.360
	W/C - LW	4.000	2.000	0.800	0.150		0.960
	W/C - SW	3.000	1.700	0.800	0.150		0.612
	Wash area- LW	1.000	1.900	0.800	0.150		0.228
	Wash area- SW	1.000	1.700	0.800	0.150		0.204
	Wash area- LW	1.000	1.900	0.800	0.150		0.228
	Cloak room- LW	1.000	3.300	0.800	0.150		0.396
	Cloak room- SW	1.000	1.800	0.800	0.150		0.216
	Courtyard	1.000	1.400	0.800	0.150		0.168
	Column	6.000	1.500	1.500	0.100		1.350
	Septic tank	1.000	5.500	2.100	0.200		2.310
	Total						**12.912**
						Total Quantity in cum	**12.912**
1.003	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	RR masonry						
	Foundation-Long wall	2.000	13.900	0.600	0.600		10.008
	Foundation-Short wall	3.000	4.800	0.600	0.600		5.184
	Foundation-Tank- LW	2.000	3.400	0.600	0.600		2.448
	Foundation-Tank -SW	2.000	1.500	0.600	0.600		1.080
	Foundation-W/C - LW	4.000	2.000	0.600	0.600		2.880
	Foundation-W/C - SW	3.000	1.700	0.600	0.600		1.836
	Foundation-Wash area- LW	1.000	1.900	0.600	0.600		0.684
	Foundation-Wash area- SW	1.000	1.700	0.600	0.600		0.612
	Foundation-Wash area- LW	1.000	1.900	0.600	0.600		0.684
	Foundation-Cloak room- LW	1.000	3.300	0.600	0.600		1.188
	Foundation-Cloak room- SW	1.000	1.800	0.600	0.600		0.648

EST No. :HED/CEHED/EST/105/2022_5_12_11 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Foundation-Courtyard	1.000	1.400	0.600	0.600		0.504
	Basement-Long wall	2.000	13.900	0.450	0.450		5.630
	Basement-Short wall	3.000	4.800	0.450	0.450		2.916
	Basement-Tank-LW	2.000	3.400	0.450	0.450		1.377
	Basement-Tank - SW	2.000	1.500	0.450	0.450		0.608
	Basement-W/C - LW	4.000	2.000	0.450	0.450		1.620
	Basement-W/C - SW	3.000	1.700	0.450	0.450		1.033
	Basement-Wash area- LW	1.000	1.900	0.450	0.450		0.385
	Basement-Wash area- SW	1.000	1.700	0.450	0.450		0.344
	Basement-Wash area- LW	1.000	1.900	0.450	0.450		0.385
	Basement-Cloak room- LW	1.000	3.300	0.450	0.450		0.668
	Basement-Cloak room- SW	1.000	1.800	0.450	0.450		0.365
	Basement-Courtyard	1.000	1.400	0.450	0.450		0.284
	Total						**43.371**
						Total Quantity in cum	**43.371**
1.004	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	Rcc up to plinth level						
	Basement-Long wall	2.000	13.900	0.450	0.100		1.251
	Basement-Short wall	3.000	4.800	0.450	0.100		0.648
	Basement-Tank-LW	2.000	3.400	0.450	0.100		0.306

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Basement-Tank - SW	2.000	1.500	0.450	0.100		0.135
	Basement-W/C - LW	4.000	2.000	0.450	0.100		0.360
	Basement-W/C - SW	3.000	1.700	0.450	0.100		0.230
	Basement-Wash area- LW	1.000	1.900	0.450	0.100		0.086
	Basement-Wash area- SW	1.000	1.700	0.450	0.100		0.077
	Basement-Wash area- LW	1.000	1.900	0.450	0.100		0.086
	Basement-Cloak room- LW	1.000	3.300	0.450	0.100		0.149
	Basement-Cloak room- SW	1.000	1.800	0.450	0.100		0.081
	Basement-Courtyard	1.000	1.400	0.450	0.100		0.063
	Column footing	6.000	1.400	1.400	0.300		3.528
		6.000	0.800	0.800	0.300		1.152
	Septic tank bed	1.000	5.300	1.900	0.150		1.511
	Side wall	1.000	14.400	0.150	1.700		3.672
	Baffle wall	2.000	1.600	0.050	1.000		0.160
	Total						**13.495**
						Total Quantity in cum	**13.495**
1.005	5.34.1						
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	Rcc up to plinth level						
	Basement-Long wall	2.000	13.900	0.450	0.100		1.251
	Basement-Short wall	3.000	4.800	0.450	0.100		0.648
	Basement-Tank-LW	2.000	3.400	0.450	0.100		0.306
	Basement-Tank - SW	2.000	1.500	0.450	0.100		0.135
	Basement-W/C - LW	4.000	2.000	0.450	0.100		0.360
	Basement-W/C - SW	3.000	1.700	0.450	0.100		0.230

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Basement-Wash area- LW	1.000	1.900	0.450	0.100		0.086
	Basement-Wash area- SW	1.000	1.700	0.450	0.100		0.077
	Basement-Wash area- LW	1.000	1.900	0.450	0.100		0.086
	Basement-Cloak room- LW	1.000	3.300	0.450	0.100		0.149
	Basement-Cloak room- SW	1.000	1.800	0.450	0.100		0.081
	Basement-Courtyard	1.000	1.400	0.450	0.100		0.063
	Column footing	6.000	1.400	1.400	0.300		3.528
		6.000	0.800	0.800	0.300		1.152
	Septic tank bed	1.000	5.300	1.900	0.150		1.511
	Side wall	1.000	14.400	0.150	1.700		3.672
	Baffle wall	2.000	1.600	0.050	1.000		0.160
	Total						**13.495**
	Lintel						
		2.000	8.400	0.200	0.150		0.504
		1.000	3.000	0.200	0.150		0.090
		3.000	5.000	0.200	0.150		0.450
		1.000	6.600	0.200	0.150		0.198
	Total						**1.242**
	Beam						
		2.000	8.400	0.300	0.300		1.512
		3.000	3.000	0.300	0.300		0.810
	Total						**2.322**
	Sunshade						
		1.000	8.400	0.600	0.100		0.504
		1.000	3.000	0.600	0.100		0.180
		1.000	5.000	0.600	0.100		0.300
		1.000	6.600	0.600	0.100		0.396
	Total						**1.380**
	Roof						
	Roof	1.000	8.900	5.600	0.150		7.476
	Deduction-courtyard	-1.000	2.000	1.700	0.150		-0.510
	Deduction- wash area	-1.000	1.800	1.100	0.150		-0.297

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**6.669**
	column						
		6.000	0.400	0.300	3.450		2.484
	Total						**2.484**
						Total Quantity in cum	**27.592**
1.006	2.25						
	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m.						
	Earth filling						
	Bath area & wash area	1.000	10.300	1.100	0.250		2.833
	Bath area	1.000	1.000	3.000	0.250		0.750
	Tank and passage around	1.000	2.900	3.700	0.450		4.829
	Passage	1.000	2.600	0.600	0.450		0.702
	w/c	4.000	1.800	1.200	0.450		3.888
	Cloak room	1.000	1.800	2.300	0.450		1.863
	Courtyard	1.000	2.000	1.700	0.450		1.530
	Wash area	1.000	1.200	0.800	0.250		0.240
	Wash area	1.000	1.400	0.800	0.250		0.280
	Passage + hand wash area	1.000	3.300	2.400	0.450		3.564
	Passage + urinal	1.000	2.000	0.800	0.450		0.720
	Passage infront of wash area	1.000	0.600	1.400	0.450		0.378
	Total						**21.577**
						Total Quantity in cum	**21.577**
1.007	4.1.6						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)						
	CC Flooring						
	Bath area & wash area	1.000	10.300	1.100	0.100		1.133
	Bath area	1.000	1.000	3.000	0.100		0.300
	Tank and passage around	1.000	2.900	3.700	0.100		1.073
	Passage	1.000	2.600	0.600	0.100		0.156
	w/c	4.000	1.800	1.200	0.100		0.864

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Cloak room	1.000	1.800	2.300	0.100		0.414
	Courtyard	1.000	2.000	1.700	0.100		0.340
	Wash area	1.000	1.200	0.800	0.100		0.096
	Wash area	1.000	1.400	0.800	0.100		0.112
	Passage + hand wash area	1.000	3.300	2.400	0.100		0.792
	Passage + urinal	1.000	2.000	0.800	0.100		0.160
	Passage infront of wash area	1.000	0.600	1.400	0.100		0.084
	Total						**5.524**
						Total Quantity in cum	**5.524**
1.008	50.6.7.2						
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.						
	Laterite masonry						
	Bath area	1.000	16.500	0.100	1.000		1.650
	Cloak room-front wall	1.000	2.900	0.100	1.000		0.290
	Cloak room	1.000	7.000	0.200	3.000		4.200
	outer wall- LW	1.000	8.300	0.200	3.000		4.980
	outer wall-SW	1.000	5.000	0.200	3.000		3.000
	W/C - LW	2.000	8.300	0.200	3.000		9.960
	W/C - SW	4.000	1.200	0.200	3.000		2.880
	Wash area	2.000	2.400	0.200	3.000		2.880
	urinal	1.000	0.600	0.200	3.000		0.360
	wall near step	2.000	0.200	0.200	3.000		0.240
	Basement-Outer wall	1.000	40.000	0.450	0.450		8.100
	Basement-Wash area	2.000	4.000	0.450	0.450		1.620
	Basement-Cloak room- LW	2.000	3.300	0.450	0.450		1.337
	Basement-Cloak room- SW	2.000	1.800	0.450	0.450		0.729
	Basement-Courtyard	1.000	5.000	0.450	0.450		1.013
	Basement-urinal	1.000	0.600	0.450	0.450		0.122
	Step	1.000	1.500	0.600	0.300		0.270
		1.000	1.500	0.300	0.300		0.135
	Step	1.000	2.000	0.600	0.300		0.360

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		1.000	2.000	0.300	0.300		0.180
	Deduction - Door	-4.000	1.000		2.100		-8.400
	Deduction - window	-1.000	1.500		1.500		-2.250
	Deduction - ventilator	-4.000	0.900		0.600		-2.160
	Total						**31.496**
						Total Quantity in cum	**31.496**
1.009	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	Lintel						
		2.000	8.400	0.200	0.150		0.504
		1.000	3.000	0.200	0.150		0.090
		3.000	5.000	0.200	0.150		0.450
		1.000	6.600	0.200	0.150		0.198
	Total						**1.242**
	Beam						
		2.000	8.400	0.300	0.300		1.512
		3.000	3.000	0.300	0.300		0.810
	Total						**2.322**
	Sunshade						
		1.000	8.400	0.600	0.100		0.504
		1.000	3.000	0.600	0.100		0.180
		1.000	5.000	0.600	0.100		0.300
		1.000	6.600	0.600	0.100		0.396
	Total						**1.380**
	Roof						
	Roof	1.000	8.900	5.600	0.150		7.476
	Deduction- courtyard	-1.000	2.000	1.700	0.150		-0.510
	Deduction- wash area	-1.000	1.800	1.100	0.150		-0.297
	Total						**6.669**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	column						
		6.000	0.400	0.300	3.450		2.484
	Total						**2.484**
						Total Quantity in cum	**14.097**
1.010	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	centering and suttering						
	Column	6.000	1.400		3.000		25.200
	Total						**25.200**
						Total Quantity in sqm	**25.200**
1.011	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	shuttering						
	Lintel	2.000	34.800		0.150		10.440
		2.000	7.800		0.150		2.340
	Beam Bottom	2.000	16.800	0.300			10.080
	Side	2.000	16.800		0.150		5.040
	Beam Bottom	2.000	9.600	0.300			5.760
	Side	2.000	9.600		0.150		2.880
	Septic tank outside all round	1.000	14.400		1.700		24.480
	Septic tank inside all round	1.000	13.200		1.700		22.440
	Baffle wall	4.000	1.600		1.000		6.400
	Total						**89.860**
						Total Quantity in sqm	**89.860**
1.012	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	centering and shuttering						
	Roof slab Bottom	1.000	8.000	3.000			24.000
	Roof slab Bottom	1.000	5.000	2.300			11.500
	Roof slab Side	1.000	28.500		0.150		4.275
	Septic tank cover	1.000	5.000	1.600			8.000
	Septic tank all side	1.000	14.400		1.700		24.480

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Septic tank all side	1.000	14.400	0.200			2.880
	Total						**75.135**
						Total Quantity in sqm	**75.135**
1.013	OD5549/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo -HCR						
	steel						
	LS quantity of 80kg/m3	27.592				80.000000	2207.360
	Total						**2207.360**
						Total Quantity in kilogram	**2207.360**
1.014	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	Wall plastering						
	Bath area internal wall	2.000	4.800		1.000		9.600
	Bath area external wall	2.000	5.000		1.000+.1		11.000
	Bath area internal wall	1.000	6.800		1.000		6.800
	Bath area external wall	1.000	6.900		1.000+.1		7.590
	Tank internal long wall	2.000	2.700		1.000		5.400
	Tank external long wall	2.000	2.900		1.000+.2		6.960
	Tank internal short wall	1.000	1.500		1.000		1.500
	Tank external short wall	1.000	1.900		1.000+.2		2.280
	External long wall	1.000	8.400		3.000		25.200
	External short wall	2.000	3.400		3.000		20.400
	W/C internal long wall	12.000	1.800		3.000		64.800
	W/C internal short wall	8.000	1.200		3.000		28.800
	Wash area wall	3.000	1.400		3.000		12.600
	Cloak room long wall	3.000	2.500		3.000		22.500

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Cloak room short wall	1.000	1.800		3.000		5.400
	Cloak room half wall	2.000	2.700		1.000+.2		6.480
	Urinal long wall	1.000	2.000		3.000		6.000
	Urinal short wall	1.000	0.800		3.000		2.400
	Courtyard wall	1.000	3.400		3.000		10.200
	Wash area long wall	1.000	1.400		3.000		4.200
	Wash area short wall	2.000	1.000		3.000		6.000
	Basement	2.000	14.000		0.450		12.600
		2.000	5.000		0.450		4.500
	Step	2.000	1.500		0.600		1.800
		2.000	0.900		0.300		0.540
	Step	2.000	2.000		0.600		2.400
		2.000	0.900		0.300		0.540
	Deduction - Door	-4.000	1.000		2.100		-8.400
	Deduction - window	-1.000	1.500		1.500		-2.250
	Deduction - ventilator	-4.000	0.900		0.600		-2.160
	Deduction - step	-1.000	1.500		0.600		-0.900
	Deduction - step	-1.000	2.000		0.600		-1.200
	Total						**273.580**
						Total Quantity in sqm	**273.580**
1.015	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	Ceiling						
	W/C	4.000	1.800	1.200			8.640
	Wash area	1.000	1.400	1.500			2.100
	Cloak room	1.000	2.300	1.800			4.140
	Urinal	1.000	2.500	0.800			2.000
	Hand wash area	1.000	3.300	2.400			7.920
	Courtyard wall	1.000	2.000	1.700			3.400
	Hand wash area	1.000	1.800	1.500			2.700
	Beam	4.000	3.600	0.900			12.960
		3.000	2.700	0.900			7.290
	Sunshade long wall	1.000	9.600	1.300			12.480

EST No. :HED/CEHED/EST/105/2022_5_12_11 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Sunshade short wall	1.000	5.600	1.300			7.280
		1.000	3.800	1.300			4.940
		1.000	2.400	1.300			3.120
		1.000	6.600	1.300			8.580
	Total						**87.550**
						Total Quantity in sqm	**87.550**
1.016	13.43.1						
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	Primer						
	W/C internal long wall	12.000	1.800		3.000		64.800
	W/C internal short wall	8.000	1.200		3.000		28.800
	Wash area wall	3.000	1.400		3.000		12.600
	Cloak room long wall	3.000	2.500		3.000		22.500
	Cloak room short wall	1.000	1.800		3.000		5.400
	Cloak room half wall	1.000	2.700		1.000+.2		3.240
	Urinal long wall	1.000	2.000		3.000		6.000
	Urinal short wall	1.000	0.800		3.000		2.400
	Courtyard wall	1.000	3.400		3.000		10.200
	Wash area long wall	1.000	1.400		3.000		4.200
	Wash area short wall	2.000	1.000		3.000		6.000
	Deduction - Door	-4.000	1.000		2.100		-8.400
	Deduction - window	-1.000	1.500		1.500		-2.250
	Deduction - ventilator	-4.000	0.900		0.600		-2.160
	Deduction - step	-1.000	1.500		0.600		-0.900
	Deduction - step	-1.000	2.000		0.600		-1.200
	W/C	4.000	1.800	1.200			8.640
	Wash area	1.000	1.400	1.500			2.100
	Cloak room	1.000	2.300	1.800			4.140
	Urinal	1.000	2.500	0.800			2.000
	Hand wash area	1.000	3.300	2.400			7.920

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Courtyard wall	1.000	2.000	1.700			3.400
	Hand wash area	1.000	1.800	1.500			2.700
	Beam	4.000	3.600	0.900			12.960
		3.000	2.700	0.900			7.290
	Deduction w/c wall	-12.000	1.800		1.500		-32.400
	Deduction w/c wall	-8.000	1.200		1.500		-14.400
	Total						**155.580**
						Total Quantity in sqm	**155.580**
1.017	13.83.2						
	Wall painting with premium acrylic emulsion paint of interior grade, having VOC (Volatile including applying additional coats wherever required to achieve even shade and colour.Two coats						
	Interior painting						
	W/C internal long wall	8.000	1.800		3.000		43.200
	W/C internal short wall	8.000	1.200		3.000		28.800
	Wash area wall	3.000	1.400		3.000		12.600
	Cloak room long wall	3.000	2.500		3.000		22.500
	Cloak room short wall	1.000	1.800		3.000		5.400
	Cloak room half wall	1.000	2.700		1.000+.2		3.240
	Urinal long wall	1.000	2.000		3.000		6.000
	Urinal short wall	1.000	0.800		3.000		2.400
	Courtyard wall	1.000	3.400		3.000		10.200
	Wash area long wall	1.000	1.400		3.000		4.200
	Wash area short wall	2.000	1.000		3.000		6.000
	Deduction - Door	-4.000	1.000		2.100		-8.400
	Deduction - window	-1.000	1.500		1.500		-2.250
	Deduction - ventilator	-4.000	0.900		0.600		-2.160
	W/C	4.000	1.800	1.200			8.640
	Wash area	1.000	1.400	1.500			2.100
	Cloak room	1.000	2.300	1.800			4.140
	Urinal	1.000	2.500	0.800			2.000

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Hand wash area	1.000	3.300	2.400			7.920
	Courtyard wall	1.000	2.000	1.700			3.400
	Hand wash area	1.000	1.800	1.500			2.700
	Beam	4.000	3.600	0.900			12.960
		3.000	2.700	0.900			7.290
	Deduction w/c wall	-8.000	1.800		1.500		-21.600
	Deduction w/c wall	-8.000	1.200		1.500		-14.400
	Total						**146.880**
						Total Quantity in sqm	**146.880**
1.018	13.47.1						
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)						
	Exterior painting						
	Bath area external wall	2.000	5.000		1.000+.1		11.000
	Bath area internal wall	1.000	6.800		1.000		6.800
	Bath area external wall	1.000	6.900		1.000+.1		7.590
	Tank internal short wall	1.000	1.500		1.000		1.500
	External long wall	1.000	8.400		3.000		25.200
	External short wall	2.000	3.400		3.000		20.400
	Wash area wall	3.000	1.400		3.000		12.600
	Basement	2.000	14.000		0.500		14.000
		2.000	5.000		0.500		5.000
	Deduction - ventilator	-4.000	0.900		0.600		-2.160
	Deduction - step	-1.000	1.500		0.600		-0.900
	Deduction - step	-1.000	2.000		0.600		-1.200
	Total						**99.830**
						Total Quantity in sqm	**99.830**
1.019	11.46.1						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and laying Vitrified tiles indifferent sizes (thickness to be specified by manufacturer), with water absorption less than 0.08 % and conforming to I.S. 15622, of approved make, in all colours & shade, in skirting, riser of steps, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand), including grouting the joint with white cement & matching pigments etc. complete.Size of Tile 500x500 mm						
	Wall & floor tiles						
	w/c	4.000	1.800	1.200			8.640
	Cloak room	1.000	20.000	2.500			50.000
	Courtyard	1.000	2.200	1.700			3.740
	Wash area	1.000	1.400	0.900			1.260
	Wash area	1.000	1.600	0.900			1.440
	Passage + hand wash area	1.000	3.500	2.600			9.100
	Passage + urinal	1.000	2.100	0.900			1.890
	Passage infront of wash area	1.000	0.700	1.400			0.980
	Step	2.000	1.500		0.600		1.800
		2.000	0.900		0.300		0.540
	Step	2.000	2.000		0.600		2.400
		2.000	0.900		0.300		0.540
	For wall w/c	4.000	5.100		1.500		30.600
	Total						**112.930**
						Total Quantity in sqm	**112.930**
1.020	50.9.1.1						
	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately), using good quality Anjili wood /jack wood						
	Frame						
	Door - V	1*2	0.100	0.070	2.100		0.029
	Door - H	1*1	1.200	0.070	0.100		0.008
	Window - Verticals	1*4	0.100	0.070	1.500		0.042
	Window- Horizontal	1*2	1.700	0.070	0.100		0.024
	Ventilator	4*2	0.900	0.100	0.070		0.050
	Ventilator	4*2	0.600	0.100	0.070		0.034
	Total						**0.187**
						Total Quantity in cum	**0.187**
1.021	50.9.3.1						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing paneled or paneled and glazed shutters for doors, windows and clerestory windows, 30 mm thick shutters including ISI marked M.S. pressed butt hinges bright finished of required size with necessary screws, excluding paneling which will be paid for separately, all complete as per direction 0f Engineer in- charge. using Anjili/ Jack wood						
	Shutter						
	Door	1.000	2.000		1.000		2.000
	Window	1*3	0.410		1.360		1.673
	Ventilator	4.000	0.460		0.760		1.398
	Total						**5.071**
						Total Quantity in sqm	**5.071**
1.022	50.9.4.1						
	Providing and fixing paneling or paneling and glazing in paneled or paneled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured) paneling for paneled or paneled and glazed shutters 25 mm to 40 mm thick using good quality Anjili/ Jack wood						
	Panel						
	Door	4.000	0.850	0.290			0.986
	Total						**0.986**
						Total Quantity in sqm	**0.986**
1.023	50.9.5.1						
	Providing and fixing glazed shutters for doors, windows and clerestory windows using 4 mm thick float glass panes including ISI marked M.S pressed butt hinges bright finished of required size with necessary screws. Using Anjili wood/ jack wood 35 mm thick shutters.						
	window glass						
	window	1*3	1.400	0.400			1.680
	ventilator	1*4	0.800	0.500			1.600
	Total						**3.280**
						Total Quantity in sqm	**3.280**
1.024	9.48.2						
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc						
	window grill						
	window- LS qty 10kg/m2	1*3	1.500	0.500		10.000000	22.500
	ventilator- LS qty 10kg/m2	1*4	0.900	0.600		10.000000	21.600
	Total						**44.100**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in kg	**44.100**
1.025	9.53						
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	Iron holdfast						
	Door - D	6.000					6.000
	Window	4.000					4.000
	Total						**10.000**
						Total Quantity in each	**10.000**
1.026	9.117.2						
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 42x50 mm						
	uPVC Door frame						
	Toilet	4*1	5.000				20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
1.027	9.118.1						
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).						
	uPVC Door shutter						
	Door	4*1	0.800		2.100		6.720
	Total						**6.720**
						Total Quantity in sqm	**6.720**
1.028	50.9.15.1						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying and fixing 200 mm Aluminium aldrop						
	Aldrop						
	Door	5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
1.029	9.63.3						
	Providing and fixing ISI marked oxidised M.S. tower bolt black finish, (Barrel type) with necessary screws etc. complete:150x10 mm						
	Tower bolt						
	Door	5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
1.030	14.35.3						
	Providing and fixing finished brass hard drawn hooks and eyes:200 mm						
	Hooks and Eyes 200mm						
	window stay	6.000					6.000
	ventilator	8.000					8.000
	Total						**14.000**
						Total Quantity in no	**14.000**
1.031	14.35.5						
	Providing and fixing finished brass hard drawn hooks and eyes:100 mm						
	Hooks and Eyes 100mm						
	window shutter	3.000					3.000
	ventilator	8.000					8.000
	Total						**11.000**
						Total Quantity in no	**11.000**
1.032	9.66.1						
	Providing and fixing ISI marked oxidised M.S. handles conforming to IS : 4992 with necessary screws etc. complete:125 mm						
	MS handle						
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.033	13.85.1						
	Applying priming coats with primer of approved brand and manufacture, having low VOC (Volatile Organic Compound) content.With ready mixed pink or grey primer on wood work (hard and soft wood) having VOC content less than 50 grams/ litre						
	priming coat on wood work						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Door	1.000	1.000		2.100	2.600000	5.460
	Window	1.000	1.500		1.500	1.600000	3.600
	Ventilator	4.000	0.900		0.600	1.600000	3.456
	Total						**12.516**
						Total Quantity in sqm	**12.516**
1.034	13.61.1						
	Painting with synthetic enamel paint of approved brand and manufacture to give an even shade:Two or more coats on new work						
	Enamel paint						
	Door	1.000	1.000		2.100	1.125000	2.363
	Window	1.000	1.500		1.500	0.500000	1.125
	Ventilator	4.000	0.900		0.600	0.500000	1.080
	Collapsible steel shutter	1.000	1.500		3.000	1.500000	6.750
	Total						**11.318**
						Total Quantity in sqm	**11.318**
1.035	13.52.1						
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work						
	Epoxy paint						
	Window	1.000	1.500		1.500	0.500000	1.125
	Ventilator	4.000	0.900		0.600	0.500000	1.080
	Courtyard	1.000	1.900		1.500	1.000000	2.850
		1.000	1.700		1.500	1.000000	2.550
	Door	1.000	1.500		2.100	1.000000	3.150
	Counter Room	1.000	2.900		1.100	1.000000	3.190
	Total						**13.945**
						Total Quantity in sqm	**13.945**
1.036	17.3.2						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.c. pan with ISI marked black solid plastic seat and lid						
	European type						
		4.000					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**
1.037	50.17.1.4						
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.						
	CP Health faucet						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.038	17.4.1						
	Providing and fixing white vitreous china flat back or wall corner type lipped front urinal basin of 430x260x350 mm and 340x410x265 mm sizes respectively with automatic flushing cistern with standard flush pipe and C.P. brass spreaders with brass unions and G.I. clamps complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required:One urinal basin with 5 litre white P.V.C. automatic flushing cistern						
	Urinal basin						
		4.000					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**
1.039	17.7.2						
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 630 x 450 mm with a single 15 mm C.P. brass pillar tap						
	Wash basin						
		6.000					6.000
	Total						**6.000**
						Total Quantity in each	**6.000**
1.040	18.48						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.						
	Tank						
		3000.000					3000.000
	Total						**3000.000**
						Total Quantity in Litre	**3000.000**
1.041	50.18.9.9.2						
	Providing and fixing PVC pipes includes joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in CHarge. 110 mm dia 4 Kg/cm2						
	pvc pipes						
		50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.042	50.18.9.7.2						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge.63 mm dia 4 Kgf/cm2						
	PVC Pipe 63mm						
		50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.043	50.18.7.4.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 10Kgf/cm2- Internal work - Exposed on wall						
	PVC PIPE 32MM						
		150.000					150.000
	Total						**150.000**
						Total Quantity in metre	**150.000**
1.044	50.18.8.3.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 25 mm pipe 10kgf /cm2						
	PVC PIPE 25MM						

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		150.000					150.000
	Total						**150.000**
						Total Quantity in metre	**150.000**
1.045	50.18.9.20.3						
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 63 mm dia Door Elbow						
	Door Elbow						
		6.000					6.000
	Total						**6.000**
						Total Quantity in no	**6.000**
1.046	50.18.9.22.3						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement-110 mm dia Door Elbow						
	Door Elbow 110mm						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.047	50.18.9.22.4						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement- 110 mm dia Bend						
	110 mm Dia Bend						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.048	50.18.9.22.6						
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 110x110x110 mm dia Door tee						
	Door Tee						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.049	50.17.1.1						
	Supplying and fixing Stainless steel soap dish including cost of materials and labour charges etc complete as per the direction of site Engineer-in-charge.						
	Soap Dish						
		10.000					10.000
	Total						**10.000**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in no	**10.000**
1.050	50.17.1.3						
	Supplying and fixing CP Towel rod 60cm or nearest available length including cost of materials and labour charges etc complete as per the direction of site Engineer-in-charge.						
	Towel Rod						
		6.000					6.000
	Total						**6.000**
						Total Quantity in no	**6.000**
1.051	50.18.9.21.7						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Vent cowl						
	Vent cowl						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.052	18.58.1.1						
	Providing and fixing PTMT grating of approved quality and colour. Circular type100 mm nominal dia						
	PTMT grating						
		10.000					10.000
	Total						**10.000**
						Total Quantity in each	**10.000**
1.053	19.4.1.1						
	Providing and fixing square-mouth S.W. gully trap class SP -1 complete with C.I. grating brick masonry chamber with water tight C.I. cover with frame of 300x300 mm size (inside) the weight of cover to be not less than 4.50 kg and frame to be not less than 2.70 kg as per standard design: 100x100 mm size P typeWith common burnt clay F.P.S. (non modular) bricks of class designation 7.5						
	Gully Trap						
		4.000					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**
1.054	18.18.2						
	Providing and fixing ball valve (brass) of approved quality, High or low pressure, with plastic floats complete:20 mm nominal bore						
	Ball valve						
		5.000					5.000
	Total						**5.000**

EST No. :HED/CEHED/EST/105/2022_5_12_11 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in each	**5.000**
1.055	18.51.1						
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore						
	Long body bib cock						
		20.000					20.000
	Total						**20.000**
						Total Quantity in each	**20.000**
1.056	17.31						
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.						
	Mirror						
		2.000					2.000
	Total						**2.000**
						Total Quantity in each	**2.000**
1.057	10.3						
	Providing and fixing in position collapsible steel shutters with vertical channels 20x10x2 mm and braced with flat iron diagonals 20x5 mm size, with top and bottom rail of T-iron 40x40x6 mm, with 40 mm dia steel pulleys, complete with bolts, nuts,locking arrangement, stoppers, handles, including applying a priming coat of approved steel primer .						
	Collapsible steel shutter						
		1.000	1.500		3.000		4.500
	Total						**4.500**
						Total Quantity in sqm	**4.500**
1.058	19.7.1.2						
	Constructing brick masonry manhole in cement mortar 1:4 (1 cement : 4 coarse sand) with R.C.C. top with 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size), foundation concrete 1:4:8 mix (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size,) inside plastering 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with floating coat of neat cement and making channels in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement complete as per standard design: Inside size 90x80 cm and 45 cm deep including C.I. cover with frame (light duty) 455x610 mm internal dimensions, total weight of cover and frame to be not less than 38 kg (weigh of cover 23 kg and weight of frame 15 kg):With Sewer bricks conforming to IS : 4885						
	manhole						
	manhole	1.000					1.000
	Total						**1.000**

EST No. :HED/CEHED/EST/105/2022_5_12_11 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in each	**1.000**
1.059	19.33						
	Constructing soak pit 1.20x1.20 m filled with brickbats including S.W. drain pipe 100 mm diameter and 1.20 m long complete as per standard design.						
	soak pit						
	soak pit	3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.060	19.15.1						
	Providing M.S. foot rests including fixing in manholes with 20x20x10 cm cement concrete blocks 1:3:6 (1 cement : 3 coarse sand: 6 graded stone aggregate 20 mm nominal size) as per standard design.With 20x20 mm square bar						
	Foot rest						
	for manhole	1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
1.061	10.2						
	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.						
	steel work						
	Courtyard LS Qty 10kg/m2	1.000	1.900		1.500	10.000 000	28.500
	LS Qty 10kg/m2	1.000	1.700		1.500	10.000 000	25.500
	Door LS Qty 10kg/m2	1.000	1.500		2.100	10.000 000	31.500
	Counter Room LS Qty 10kg/m2	1.000	2.900		1.100	10.000 000	31.900
	Total						**117.400**
						Total Quantity in kg	**117.400**

EST No. :HED/CEHED/EST/105/2022_5_9_8 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District-Construction of Approach Road to Fishing Harbour-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Approach road**			
1.001	3.15			
	Scarifying the existing bituminous road surface to a depth of 50 mm and disposal of scarified material with in all lifts and lead upto 1000 metres by Mechanical Means			
	Net Total	3135.000sqm	@5.55/sqm	17399.25
1.002	2.2			
	Clearing grass and removal of rubbish up to a distance of 50 metres outside the periphery of the area			
	Net Total	0.095Hectare	@46902.97/Hectare	4455.78
1.003	2.1.1			
	Cutting of trees, including cutting of trunks, branches and removal of stumps, roots, stacking of serviceable material with all lifts and up to a lead of 1000 metres and earth filling in the depression/pit. Girth from 300 mm to 600 mm			
	Net Total	30.000each	@603.02/each	18090.60
1.004	4.1.A.2			
	Construction of granular sub-base by providing graded Material, mixing in a mechanical mix plant at OMC, carriage of mixed Material to work site, spreading in uniform layers with a motor grader on the prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per clause 401 Grading-II - Plant Mix Method			
	Net Total	826.500cum	@3280.48/cum	2711316.72
1.005	4.12			
	Providing, laying, spreading and compacting graded stone aggregate to Wet Mix Macadam specification including premixing the Material with water at OMC in mechanical mix plant carriage of mixed Material by tipper to site, laying in uniform layers with paver in sub- base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density.			
	Net Total	826.500cum	@3183.84/cum	2631443.76
1.006	5.1.a			
	Providing and applying primer coat with bitumen emulsion (SS) on prepared surface of granular Base including clearing of road surface and spraying primer at the rate of 0.70 - 1.0 kg/sqm using mechanical means.			
	Net Total	5225.000sqm	@57.98/sqm	302945.50
1.007	5.2.b			
	Providing and applying tack coat with bitumen emulsion (RS) using emulsion			

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EST No. :HED/CEHED/EST/105/2022_5_9_8 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	pressure distributor at the rate of 0.25 - 0.30 kg per sqm on the prepared Granular Surface cleaned with mechanical broom.			
	Net Total	5225.000sqm	@13.05/sqm	68186.25
1.008	5.3.2.a			
	Providing and laying bituminous macadam with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading premixed with a bituminous binder (VG 30), transported to the site, laid over a previously prepared surface with paver finisher to the required grade, level, and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction For Grading II - (19 mm nominal size)			
	Net Total	261.250cum	@7787.76/cum	2034552.30
1.009	5.2.a			
	Providing and applying tack coat with bitumen emulsion(RS) using emulsion pressure distributor at the rate of 0.20 - 0.30 kg per sqm on the prepared bituminous surface cleaned with mechanical broom.			
	Net Total	5225.000sqm	@10.79/sqm	56377.75
1.010	5.6.2.a			
	Providing and laying bituminous concrete with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with a bituminous binder(NRMB) @ 5.4 percent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level, and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 507 complete in all respects For Grading - II (13.2 mm Nominal Size)			
	Net Total	156.750cum	@12465.77/cum	1954009.45
1.011	8.13			
	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads on Bituminous Surface @ 250 gms per sqm area, the thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35. The finished surface to be level, uniform, and free from streaks and holes.			
	Net Total	300.000sqm	@494.43/sqm	148329.00
1.012	8.35			
	Providing and fixing reflective road studs (Raised Pavement Marker) of ' category A' made out of ASA/HIPS/ABS moulded body with shanks and conforming to ASTM D 4280, strong enough to support a load of more than 13.635 T when tested in accordance with ASTM D 4280, reflective panel confirming to ASTM D 788, and reflectivity conforming to clause 804.4. including installation, drilling, fixing with adhesive etc. with 2 years warranty for the road stud as well as for in field performance as per clause 804.7.3 Road Markers/Road Stud with Lense Reflector :-			
	Net Total	720.000no	@195.85/no	141012.00
			Heading Total(Rs)	10088118.36
			Total Estimation PAC	

EST No. :HED/CEHED/EST/105/2022_5_9_8 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
				10088118.36
Sl No	**Description**		**Percentage/LS**	**Amount**
2	**Lumsum Heading**			
2.001	Charges for Utility shifting - KSEB			
		0.00	0.00%	300000.00
2.002	Cost of Land Acquisition			
		0.00	0.00%	1000000.00
2.003	LS provision for part TS			
		0.00	0.00%	570000.00
			Total Lumsum Amount	1870000.00
3	**Extra Charges**			
2.001	Provision for GST			
		10088118.36	18.00%	1815861.30
			Grand Total	13773979.66
			Round off	26020.34
			Rounded Total(Rs)	13800000.00
	Rupees One Crore Thirty Eight Lakh			

ePRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

EST No. :HED/CEHED/EST/105/2022_5_9_8 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District-Construction of Approach Road to Fishing Harbour-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Approach road						
1.001	3.15						
	Scarifying the existing bituminous road surface to a depth of 50 mm and disposal of scarified material with in all lifts and lead upto 1000 metres by Mechanical Means						
	Existing village road 950m						
		1.000	950.000	3.300			3135.000
	Total						**3135.000**
						Total Quantity in sqm	**3135.000**
1.002	2.2						
	Clearing grass and removal of rubbish up to a distance of 50 metres outside the periphery of the area						
	for Approach Road						
		1.000	950.000	1.000		0.000100	0.095
	Total						**0.095**
						Total Quantity in Hectare	**0.095**
1.003	2.1.1						
	Cutting of trees, including cutting of trunks, branches and removal of stumps, roots, stacking of serviceable material with all lifts and up to a lead of 1000 metres and earth filling in the depression/pit. Girth from 300 mm to 600 mm						
	coconut trees						
		30.000					30.000
	Total						**30.000**
						Total Quantity in each	**30.000**
1.004	4.1.A.2						
	Construction of granular sub-base by providing graded Material, mixing in a mechanical mix plant at OMC, carriage of mixed Material to work site, spreading in uniform layers with a motor grader on the prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per clause 401 Grading-II - Plant Mix Method						
	Approach road						
		1.000	950.000	5.800	0.150		826.500
	Total						**826.500**
						Total Quantity in cum	**826.500**

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EST No. :HED/CEHED/EST/105/2022_5_9_8 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.005	4.12						
	Providing, laying, spreading and compacting graded stone aggregate to Wet Mix Macadam specification including premixing the Material with water at OMC in mechanical mix plant carriage of mixed Material by tipper to site, laying in uniform layers with paver in sub- base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density.						
	for Approach Road						
		1.000	950.000	5.800	0.150		826.500
	Total						**826.500**
						Total Quantity in cum	**826.500**
1.006	5.1.a						
	Providing and applying primer coat with bitumen emulsion (SS) on prepared surface of granular Base including clearing of road surface and spraying primer at the rate of 0.70 - 1.0 kg/sqm using mechanical means.						
	for Approach Road						
		1.000	950.000	5.500			5225.000
	Total						**5225.000**
						Total Quantity in sqm	**5225.000**
1.007	5.2.b						
	Providing and applying tack coat with bitumen emulsion (RS) using emulsion pressure distributor at the rate of 0.25 - 0.30 kg per sqm on the prepared Granular Surface cleaned with mechanical broom.						
	for Approach Road						
		1.000	950.000	5.500			5225.000
	Total						**5225.000**
						Total Quantity in sqm	**5225.000**
1.008	5.3.2.a						
	Providing and laying bituminous macadam with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading premixed with a bituminous binder (VG 30), transported to the site, laid over a previously prepared surface with paver finisher to the required grade, level, and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction For Grading II - (19 mm nominal size)						
	for Approach Road-BM						
		1.000	950.000	5.500	0.050		261.250
	Total						**261.250**
						Total Quantity in cum	**261.250**
1.009	5.2.a						
	Providing and applying tack coat with bitumen emulsion(RS) using emulsion pressure distributor at the rate of 0.20 - 0.30 kg per sqm on the prepared bituminous surface cleaned with mechanical broom.						

EST No. :HED/CEHED/EST/105/2022_5_9_8 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for Approach Road						
		1.000	950.000	5.500			5225.000
	Total						**5225.000**
						Total Quantity in sqm	**5225.000**
1.010	5.6.2.a						
	Providing and laying bituminous concrete with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with a bituminous binder(NRMB) @ 5.4 percent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level, and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 507 complete in all respects For Grading - II (13.2 mm Nominal Size)						
	for Approach Road-BC						
		1.000	950.000	5.500	0.030		156.750
	Total						**156.750**
						Total Quantity in cum	**156.750**
1.011	8.13						
	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads on Bituminous Surface @ 250 gms per sqm area, the thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35. The finished surface to be level, uniform, and free from streaks and holes.						
	for Approach Road						
	ch0-950	2.000	950.000	0.150			285.000
	zebra crossing	10.000	2.500	0.500			12.500
	Rounding	1.000			2.500		2.500
	Total						**300.000**
						Total Quantity in sqm	**300.000**
1.012	8.35						
	Providing and fixing reflective road studs (Raised Pavement Marker) of ' category A' made out of ASA/HIPS/ABS moulded body with shanks and conforming to ASTM D 4280, strong enough to support a load of more than 13.635 T when tested in accordance with ASTM D 4280, reflective panel confirming to ASTM D 788, and reflectivity conforming to clause 804.4. including installation, drilling, fixing with adhesive etc. with 2 years warranty for the road stud as well as for in field performance as per clause 804.7.3 Road Markers/Road Stud with Lense Reflector :-						
	for Approach Road						
	both side	2.000	300.000				600.000
	for zebra crossing	10*12					120.000
	Total						**720.000**
						Total Quantity in no	**720.000**

EST No. :HED/CEHED/EST/105/2022_5_14_13 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasargod District- Construction of Work shop Building-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Civil work**			
1.001	2.8.1			
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil			
	Net Total	188.111cum	@291.42/cum	54819.31
1.002	50.2.3.1			
	Pumping or Bailing out water and removing slush etc by using pump set including cost of labour, oil hire charges of pumpset, etc complete			
	Net Total	50.000hour	@279.29/hour	13964.50
1.003	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	21.828cum	@6687.21/cum	145968.42
1.004	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	23.184cum	@7069.78/cum	163905.78
1.005	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	52.077cum	@9237.20/cum	481045.66
1.006	5.34.1			
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30			

EST No. :HED/CEHED/EST/105/2022_5_14_13 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	85.538cum	@80.55/cum	6890.09
1.007	50.2.25.1			
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge			
	Net Total	28.981cum	@515.98/cum	14953.62
1.008	4.1.6			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)			
	Net Total	8.280cum	@7076.05/cum	58589.69
1.009	60.7.2			
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.			
	Net Total	4.969cum	@2557.65/cum	12708.96
1.010	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	33.461cum	@10858.36/cum	363331.58
1.011	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	145.100sqm	@329.03/sqm	47742.25
1.012	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	148.924sqm	@800.47/sqm	119209.19
1.013	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	145.770sqm	@637.63/sqm	92947.33

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Sl No	Specification	Quantity	Rate	Amount
1.014	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	99.400sqm	@847.44/sqm	84235.54
1.015	OD5543/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR			
	Net Total	7013.440kilogram	@96.62/kilogram	677638.57
1.016	50.6.7.2			
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.			
	Net Total	68.406cum	@7872.96/cum	538557.70
1.017	21.1.1.1			
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)			
	Net Total	165.600kg	@489.70/kg	81094.32
1.018	21.3.2			
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 5.50 mm thickness			
	Net Total	12.640sqm	@1497.40/sqm	18927.14
1.019	9.116			
	Providing and fixing sliding arrangement in racks/ cupboards/cabinets shutter by with stainless steel rollers to run inside C or E aluminium channel section (The payment of C or E channel shall be made separately			
	Net Total	36.000no	@17.12/no	616.32
1.020	9.117.1			
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets			

EST No. :HED/CEHED/EST/105/2022_5_14_13 (Edit Id : 5)
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Sl No	Specification	Quantity	Rate	Amount
	and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 48x40 mm			
	Net Total	15.600metre	@256.03/metre	3994.07
1.021	9.118.1			
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).			
	Net Total	5.400sqm	@2033.68/sqm	10981.87
1.022	9.53			
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	56.000each	@207.00/each	11592.00
1.023	9.97.5			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:100x10 mm			
	Net Total	3.000no	@67.14/no	201.42
1.024	50.9.15.1			
	Supplying and fixing 200 mm Aluminium aldrop			
	Net Total	3.000no	@171.51/no	514.53
1.025	10.6.1			
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover			

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Sl No	Specification	Quantity	Rate	Amount
	Net Total	32.560sqm	@3400.57/sqm	110722.56
1.026	10.2			
	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.			
	Net Total	34.440kg	@117.55/kg	4048.42
1.027	50.18.9.22.8			
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement -110 mm dia Vent cowl			
	Net Total	1.000no	@123.09/no	123.09
1.028	50.18.7.4.2			
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall			
	Net Total	50.000metre	@295.71/metre	14785.50
1.029	50.18.7.6.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 10 Kfg/cm - Internal work- Exposed on wall			
	Net Total	40.000metre	@409.92/metre	16396.80
1.030	50.18.9.4.2			
	Providing and fixing PVC pipes includings joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 32 mm dia 6 Kgf/cm2			
	Net Total	40.000metre	@218.52/metre	8740.80
1.031	50.18.9.9.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2			
	Net Total	40.000metre	@521.14/metre	20845.60
1.032	50.18.9.13.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 25 mm dia 10 Kgf/cm2- External work - Exposed on wall			
	Net Total	50.000metre	@271.93/metre	13596.50
1.033	50.18.9.14.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm			

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Sl No	Specification	Quantity	Rate	Amount
	dia 6 Kgf/cm2 - External work - Exposed on wall			
	Net Total	50.000metre	@305.29/metre	15264.50
1.034	50.18.9.18.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall			
	Net Total	50.000metre	@279.39/metre	13969.50
1.035	50.18.9.19.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/ clips/ at 1.00 m spacing . This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 mm dia 6 Kgf/cm2 - External work- Exposed on wall			
	Net Total	40.000metre	@379.40/metre	15176.00
1.036	13.1.1			
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	687.425sqm	@308.22/sqm	211878.13
1.037	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	82.800sqm	@262.57/sqm	21740.80
1.038	11.36			
	Providing and fixing I st quality ceramic glazed wall tiles conforming to IS : 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer -in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3 kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.			
	Net Total	8.150sqm	@1190.03/sqm	9698.74
1.039	11.41.2			
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.			
	Net Total	95.220sqm	@1733.20/sqm	165035.30
1.040	13.48.1			
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm			
	Net Total	762.075sqm	@164.22/sqm	125147.96
1.041	13.52.1			

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Sl No	Specification	Quantity	Rate	Amount
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work			
	Net Total	106.072sqm	@219.17/sqm	23247.80
1.042	17.3.1			
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.C. pan with ISI marked white solid plastic seat and lid			
	Net Total	1.000each	@7721.48/each	7721.48
1.043	50.17.1.4			
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.			
	Net Total	1.000no	@758.07/no	758.07
1.044	17.7.3			
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 550x400 mm with a pair of 15 mm C.P. brass pillar taps			
	Net Total	3.000each	@3288.29/each	9864.87
1.045	18.51.1			
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore			
	Net Total	4.000each	@637.96/each	2551.84
1.046	18.52.1			
	Providing and fixing C.P brass stop cock (concealed) of standard design and of approved make conforming to IS: 893115 mm nominal bore			
	Net Total	5.000each	@700.27/each	3501.35
1.047	17.73.1			
	Providing and fixing PTMT towel rail complete with brackets fixed to wooden cleats with CP brass screws with concealed fitting arrangement of approved quality and colour450 mm long towel rail with total length of 495 mm, 78 mm wide and effective height of 88 mm. weighing not less than 170 gms			
	Net Total	2.000no	@641.43/no	1282.86
1.048	17.74			
	Providing and fixing PTMT shelf 440 mm long, 124 mm width and 36 mm height of approved quality and colour, weighing not less than 300 gms.			
	Net Total	1.000no	@741.89/no	741.89
1.049	18.65			

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Sl No	Specification	Quantity	Rate	Amount
	Providing and fixing PTMT Soap Dish Holder having length of 138 mm, breadth 102 mm, height of 75 mm with concealed fittings arrangements, weighing not less than 106 gms.			
	Net Total	1.000each	@150.72/each	150.72
1.050	17.71			
	Providing and fixing PTMT liquid soap container 109 mm wide, 125 mm high and 112 mm distance from wall of standard shape with bracket of the same materials with snap fittings of approved quality and colour, weighing not less than 105 gms			
	Net Total	2.000each	@183.17/each	366.34
1.051	17.31			
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.			
	Net Total	1.000each	@1481.95/each	1481.95
1.052	18.48			
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.			
	Net Total	1000.000Litre	@10.18/Litre	10180.00
			Heading Total(Rs)	3833449.23
			Total Estimation PAC	3833449.23
Sl No	**Description**		**Percentage/LS**	**Amount**
2	**Lumsum Heading**			
2.001	LS Amount for Electrification			
		0.00	0.00%	150000.00
			Total Lumsum Amount	150000.00
3	**Extra Charges**			
2.001	Provision for GST			
		3833449.23	18.00%	690020.86
			Grand Total	4673470.09
			Round off	6529.91
			Rounded Total(Rs)	4680000.00
	Rupees Forty Six Lakh Eighty Thousand			

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DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasargod District- Construction of Work shop Building-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Civil work						
1.001	2.8.1						
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil						
	Earthwork						
	Footing 2.0x2.0	16.000	2.200	2.200	1.550		120.032
	Outer wall	2.000	10.050	0.800	0.750		12.060
		2.000	9.400	0.800	0.750		11.280
	Cross wall-rooms	2.000	6.000	0.800	0.750		7.200
		5.000	2.700	0.800	0.750		8.100
	Ramp	2.000	6.000	2.900	0.150		5.220
	Septic Tank	1.000	6.000	2.500	1.500		22.500
	Soak pit	1.000	1.250	1.250	1.100		1.719
	Total						**188.111**
						Total Quantity in cum	**188.111**
1.002	50.2.3.1						
	Pumping or Bailing out water and removing slush etc by using pump set including cost of labour, oil hire charges of pumpset, etc complete						
	Pumping						
	For footing	50.000					50.000
	Total						**50.000**
						Total Quantity in hour	**50.000**
1.003	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	PCC						
	Footing 2.0x2.0	16.000	2.200	2.200	0.150		11.616
	Outer wall	2.000	10.050	0.800	0.150		2.412
		2.000	9.400	0.800	0.150		2.256
	Cross wall-rooms	2.000	6.000	0.800	0.150		1.440

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		5.000	2.700	0.800	0.150		1.620
	Septic Tank	1.000	6.000	2.500	0.150		2.250
	Soak pit	1.000	1.250	1.250	0.150		0.234
	Total						**21.828**
						Total Quantity in cum	**21.828**
1.004	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	RR masonry						
	Outer wall	2.000	10.050	0.600	0.600		7.236
		2.000	9.400	0.600	0.600		6.768
	Cross wall-rooms	2.000	6.000	0.600	0.600		4.320
		5.000	2.700	0.600	0.600		4.860
	Total						**23.184**
						Total Quantity in cum	**23.184**
1.005	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	RCC- upto plinth level						
	Footing	16.000	2.000	2.000	0.200		12.800
		16.000	1/3	(2*2)+(0.5*0.5)+(2*0.5)	0.200		5.600
	Footing pedestal	0.950	0.500	0.500	1.000		0.238
	Plinth beam	2.000	10.050	0.450	0.450		4.070
	Short wall	2.000	9.400	0.450	0.450		3.807
	Cross wall-rooms	2.000	6.000	0.450	0.450		2.430
		5.000	2.700	0.450	0.450		2.734
	Ramp	2.000	6.000	2.900	(0.60+0.15)/2		13.050
	Soak pit	1.000	4*1.25	0.200	1.000		1.000
	Septic Tank -bed slab	1.000	6.000	2.500	0.150		2.250

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Septic Tank -side wall	2.000	2.100	0.200	1.100		0.924
	Septic Tank -side wall	2.000	0.600	0.200	1.100		0.264
	Septic Tank - baffle wall	2.000	2.100	0.150	0.800		0.504
	Septic Tank - cover slab	1.000	6.000	2.500	0.150		2.250
	Soak pit -cover slab	1.000	1.250	1.250	0.100		0.156
	Total						**52.077**
						Total Quantity in cum	**52.077**
1.006	5.34.1						
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	RCC- upto plinth level						
	Footing	16.000	2.000	2.000	0.200		12.800
		16.000	1/3	(2*2)+(0.5*0.5)+(2*0.5)	0.200		5.600
	Footing pedestal	0.950	0.500	0.500	1.000		0.238
	Plinth beam	2.000	10.050	0.450	0.450		4.070
	Short wall	2.000	9.400	0.450	0.450		3.807
	Cross wall-rooms	2.000	6.000	0.450	0.450		2.430
		5.000	2.700	0.450	0.450		2.734
	Ramp	2.000	6.000	2.900	(0.60+0.15)/2		13.050
	Soak pit	1.000	4*1.25	0.200	1.000		1.000
	Septic Tank -bed slab	1.000	6.000	2.500	0.150		2.250
	Septic Tank -side wall	2.000	2.100	0.200	1.100		0.924
	Septic Tank -side wall	2.000	0.600	0.200	1.100		0.264
	Septic Tank - baffle wall	2.000	2.100	0.150	0.800		0.504
	Septic Tank - cover slab	1.000	6.000	2.500	0.150		2.250
	Soak pit -cover slab	1.000	1.250	1.250	0.100		0.156
	Total						**52.077**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Lintel						
	Outer wall	4.000	9.800	0.200	0.150		1.176
	Cross wall-rooms	2.000	6.000	0.200	0.150		0.360
		5.000	2.700	0.200	0.150		0.405
	Total						**1.941**
	Beam						
	longitudinal	12.000	2.900	0.300	0.350		3.654
	transverse	12.000	2.800	0.300	0.350		3.528
	Total						**7.182**
	Roof slab						
	Roof slab	1.000	10.400	10.400	0.120		12.979
	Deduct crane room	-1.000	3.000	3.000	0.120		-1.080
	crane room slab	1.000	4.000	4.000	0.120		1.920
	Total						**13.819**
	Sunshade						
	Outer wall	4.000	9.800	0.600	(0.1+0.07)/2		1.999
	Total						**1.999**
	Columns						
	Columns	12.000	0.300	0.400	4.100		5.904
	Columns for crane room	4.000	0.300	0.400	5.450		2.616
	Total						**8.520**
						Total Quantity in cum	**85.538**
1.007	50.2.25.1						
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge						
	Filling						
	shop & workshop rooms	3.000	3.000	3.000	0.350		9.450
	office room	1.000	1.750	3.000	0.350		1.838
	workspace	1.000	3.000	9.400	0.350		9.870
	toilet	1.000	1.050	1.200	0.350		0.441
	passage+ crane facility	1.000	6.400	3.000	0.350		6.720
	passage to w/c	1.000	1.050	1.800	0.350		0.662
	Total						**28.981**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**28.981**
1.008	4.1.6						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)						
	CC Flooring						
	shop & workshop rooms	3.000	3.000	3.000	0.100		2.700
	office room	1.000	1.750	3.000	0.100		0.525
	workspace	1.000	3.000	9.400	0.100		2.820
	toilet	1.000	1.050	1.200	0.100		0.126
	passage+ crane facility	1.000	6.400	3.000	0.100		1.920
	passage to w/c	1.000	1.050	1.800	0.100		0.189
	Total						**8.280**
						Total Quantity in cum	**8.280**
1.009	60.7.2						
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.						
	DR packing						
	Septic tank	1.000	6.000	2.500	0.300		4.500
	Soak pit	1.000	1.250	1.250	0.300		0.469
	Total						**4.969**
						Total Quantity in cum	**4.969**
1.010	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	Lintel						
	Outer wall	4.000	9.800	0.200	0.150		1.176
	Cross wall-rooms	2.000	6.000	0.200	0.150		0.360
		5.000	2.700	0.200	0.150		0.405
	Total						**1.941**
	Beam						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	longitudinal	12.000	2.900	0.300	0.350		3.654
	transverse	12.000	2.800	0.300	0.350		3.528
	Total						**7.182**
	Roof slab						
	Roof slab	1.000	10.400	10.400	0.120		12.979
	Deduct crane room	-1.000	3.000	3.000	0.120		-1.080
	crane room slab	1.000	4.000	4.000	0.120		1.920
	Total						**13.819**
	Sunshade						
	Outer wall	4.000	9.800	0.600	(0.1+0.07)/2		1.999
	Total						**1.999**
	Columns						
	Columns	12.000	0.300	0.400	4.100		5.904
	Columns for crane room	4.000	0.300	0.400	5.450		2.616
	Total						**8.520**
						Total Quantity in cum	**33.461**
1.011	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	Footing & foundations						
	Footing PCC	4*16	2.200		0.150		21.120
	Footing RCC	4*16	2.000		0.200		25.600
	Pedestal	4*16	0.500		1.000		32.000
	Septic Tank-bed slab	1.000	6+2.5		0.150		1.275
	Soak pit-bed slab	1.000	1.250+1.250		0.150		0.375
	Septic Tank -side wall	2*2	2.1+6		1.100		35.640
	Septic Tank - baffle wall	2*2	2.100		0.800		6.720
	Septic Tank - cover slab	2.000	6+2.5		0.150		2.550
	Soak pit -cover slab	4.000	1.250		0.100		0.500
	Outer wall	2*2.000	10.050		0.150		6.030

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(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		2*2.000	9.400		0.150		5.640
	Cross wall-rooms	2*2.000	6.000		0.150		3.600
		2*5.000	2.700		0.150		4.050
	Total						**145.100**
						Total Quantity in sqm	**145.100**
1.012	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Slabs						
	Roof slab	1.000	10.400	10.400			108.160
		4.000	10.400		0.120		4.992
	Deduct crane room	-1.000	3.000	3.000			-9.000
	crane room slab	1.000	4.000	4.000			16.000
		4.000	4.000		0.120		1.920
	Total						**122.072**
	Sunshade						
	sunshade	4.000	9.800	0.600			23.520
		4.000	9.800		(0.1+0.07)/2		3.332
	Total						**26.852**
						Total Quantity in sqm	**148.924**
1.013	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	Plinth beam						
	Outer wall	2*2.000	10.050		0.450		18.090
		2*2.000	9.400		0.450		16.920
	Cross wall-rooms	2*2.000	6.000		0.450		10.800
		2*5.000	2.700		0.450		12.150
	Total						**57.960**
	Lintel						
	Outer wall	2*4.000	9.800		0.150		11.760

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Cross wall-rooms	2*2.000	6.000		0.150		3.600
		2*5.000	2.700		0.150		4.050
	Total						**19.410**
	Beams						
	longitudinal	12.000	2.900	0.300			10.440
	longitudinal	2*12.000	2.900		0.350		24.360
	transverse	12.000	2.800	0.300			10.080
	transverse	2*12.000	2.800		0.350		23.520
	Total						**68.400**
						Total Quantity in sqm	**145.770**
1.014	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	Columns						
	Columns	12.000	(0.300+0.4)*2		4.100		68.880
	Columns for crane room	4.000	(0.300+0.4)*2		5.450		30.520
	Total						**99.400**
						Total Quantity in sqm	**99.400**
1.015	OD5543/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR						
	Steel						
	LS Qty-80kg/m3 For item no.5	52.077				80.000000	4166.160
	For item no.10	8.520				100.000000	852.000
	For item no.10	24.941				80.000000	1995.280
	Total						**7013.440**
						Total Quantity in kilogram	**7013.440**
1.016	50.6.7.2						
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.						
	Laterite masonry						

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(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Outer wall	2.000	10.050	0.200	4.100		16.482
		1.000	9.400	0.200	4.100		7.708
	Cross wall-rooms	2.000	6.000	0.200	4.100		9.840
		5.000	2.700	0.200	4.100		11.070
	additional height for crane room	1.000	9.000	0.200	5.45-4.100		2.430
	Parapet wall	4.000	10.100		0.800		32.320
	deductions- RS1	-2.000	1.500	0.200	3.700		-2.220
	deductions- RS2	-2.000	2.900	0.200	3.700		-4.292
	deductions- Door D	-2.000	1.100	0.200	2.100		-0.924
	deductions- Door D1	-1.000	0.800	0.200	2.100		-0.336
	deductions- Window W	-6.000	1.500	0.200	1.500		-2.700
	deductions- Window W1	-3.000	1.000	0.200	1.500		-0.900
	deductions- Ventilator V	-1.000	0.600	0.200	0.600		-0.072
	Total						**68.406**
						Total Quantity in cum	**68.406**
1.017	21.1.1.1						
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)						
	Aluminium window						
	Window frame, W	6.000	4*(1.5+.8)			2.000000	110.400
	Window frame, W1	3.000	4*(1.5+.6)			2.000000	50.400
	ventilator V	1.000	4*0.600			2.000000	4.800
	Total						**165.600**
						Total Quantity in kg	**165.600**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.018	21.3.2						
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 5.50 mm thickness						
	Glazing						
	Window W	2*6	1.300	0.600			9.360
	Window W1	2*3	1.300	0.400			3.120
	ventilator V	1.000	0.400	0.400			0.160
	Total						**12.640**
						Total Quantity in sqm	**12.640**
1.019	9.116						
	Providing and fixing sliding arrangement in racks/ cupboards/cabinets shutter by with stainless steel rollers to run inside C or E aluminium channel section (The payment of C or E channel shall be made separately						
	Sliding arrangement						
	Windows	4*9					36.000
	Total						**36.000**
						Total Quantity in no	**36.000**
1.020	9.117.1						
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 48x40 mm						
	frame						
	Door D	2*2	2.100				8.400
	Door D	1*2	1.100				2.200
	Door D1	2*1.000	2.100				4.200
	Door D1	1.000	0.800				0.800
	Total						**15.600**
						Total Quantity in metre	**15.600**
1.021	9.118.1						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).						
	Shutter						
	D	2.000	1.000		2.000		4.000
	D1	1.000	0.700		2.000		1.400
	Total						**5.400**
						Total Quantity in sqm	**5.400**
1.022	9.53						
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	Hold fast						
	Door	3*6				1.000000	18.000
	Window	9*4				1.000000	36.000
	V	1*2				1.000000	2.000
	Total						**56.000**
						Total Quantity in each	**56.000**
1.023	9.97.5						
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:100x10 mm						
	Tower bolt						
	Doors	3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.024	50.9.15.1						
	Supplying and fixing 200 mm Aluminium aldrop						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Aluminium aldrop						
	For doors	3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.025	10.6.1						
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover						
	Rolling shutter						
	RS1	2.000	1.500		3.700		11.100
	RS2	2.000	2.900		3.700		21.460
	Total						**32.560**
						Total Quantity in sqm	**32.560**
1.026	10.2						
	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.						
	Grill						
	LS Qty 10kg/m2	3.000	2.800		4.100		34.440
	Total						**34.440**
						Total Quantity in kg	**34.440**
1.027	50.18.9.22.8						
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement -110 mm dia Vent cowl						
	Vent cowl						
	For toilet	1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.028	50.18.7.4.2						
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall						
	PVC Pipe						
	32mm	50.000					50.000
	Total						**50.000**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in metre	**50.000**
1.029	50.18.7.6.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 10 Kfg/cm - Internal work- Exposed on wall						
	PVC Pipe						
	50mm	40.000					40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.030	50.18.9.4.2						
	Providing and fixing PVC pipes includings joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 32 mm dia 6 Kgf/cm2						
	PVC Pipe						
	32mm	40.000					40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.031	50.18.9.9.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2						
	PVC Pipe						
	110mm	40.000					40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.032	50.18.9.13.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 25 mm dia 10 Kgf/cm2- External work - Exposed on wall						
	PVC Pipe						
	25mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.033	50.18.9.14.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - External work - Exposed on wall						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	PVC Pipe						
	32mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.034	50.18.9.18.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall						
	PVC Pipe						
	75mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.035	50.18.9.19.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/ clips/ at 1.00 m spacing . This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 mm dia 6 Kgf/cm2 - External work- Exposed on wall						
	PVC Pipe						
	110mm	40.000					40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.036	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	Plastering						
	Outer wall	2*2.000	10.050		4.100		164.820
		2*1.000	9.400		4.100		77.080
	Cross wall-rooms	2*2.000	6.000		4.100		98.400
		2*5.000	2.700		4.100		110.700
	additional height for crane room	2*1.000	9.000		5.45-4.100		24.300
	Parapet wall	2*4.000	10.100		0.800+.8+.10		137.360
	Sunshade	2*4.000	9.800	0.600			47.040
	Plinth beam	2.000	10.050		0.450		9.045
		2.000	9.400		0.450		8.460

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	LS for beam and column projections	100.000					100.000
	deductions- RS1	-2*2.000	1.500		3.700		-22.200
	deductions- RS2	-2*2.000	2.900		3.700		-42.920
	deductions- Door D	-2.000	1.100		2.100		-4.620
	deductions- Door D1	-1.000	0.800		2.100		-1.680
	deductions- Window W	-6.000	1.500		1.500		-13.500
	deductions- Window W1	-3.000	1.000		1.500		-4.500
	deductions- Ventilator V	-1.000	0.600		0.600		-0.360
	Total						**687.425**
						Total Quantity in sqm	**687.425**
1.037	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	Ceiling plastering						
	shop & workshop rooms	3.000	3.000	3.000			27.000
	office room	1.000	1.750	3.000			5.250
	workspace	1.000	3.000	9.400			28.200
	toilet	1.000	1.050	1.200			1.260
	passage+ crane facility	1.000	6.400	3.000			19.200
	passage to w/c	1.000	1.050	1.800			1.890
	Total						**82.800**
						Total Quantity in sqm	**82.800**
1.038	11.36						
	Providing and fixing I st quality ceramic glazed wall tiles conforming to IS : 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer -in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3 kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.						
	Wall tiles						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	w/c	1.000	2*(1.05+ 1.2)		1.500		6.750
	Wash area	1.000	2.000		0.700		1.400
	Total						**8.150**
						Total Quantity in sqm	**8.150**
1.039	11.41.2						
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.						
	Floor Tile						
	shop & workshop rooms	3.000	3.000	3.000			27.000
	office room	1.000	1.750	3.000			5.250
	workspace	1.000	3.000	9.400			28.200
	toilet	1.000	1.050	1.200			1.260
	passage+ crane facility	1.000	6.400	3.000			19.200
	passage to w/c	1.000	1.050	1.800			1.890
	For Skirting - 15% of floor area	82.800				0.150000	12.420
	Total						**95.220**
						Total Quantity in sqm	**95.220**
1.040	13.48.1						
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm						
	Painting						
	ceiling- shop & workshop rooms	3.000	3.000	3.000			27.000
	office room	1.000	1.750	3.000			5.250
	workspace	1.000	3.000	9.400			28.200
	toilet	1.000	1.050	1.200			1.260
	passage+ crane facility	1.000	6.400	3.000			19.200
	passage to w/c	1.000	1.050	1.800			1.890
	Outer wall	2*2.000	10.050		4.100		164.820
		2*1.000	9.400		4.100		77.080

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Cross wall-rooms	2*2.000	6.000		4.100		98.400
		2*5.000	2.700		4.100		110.700
	additional height for crane room	2*1.000	9.000		5.45-4.100		24.300
	Parapet wall	2*4.000	10.100		0.800+.8+.10		137.360
	Sunshade	2*4.000	9.800	0.600			47.040
	Plinth beam	2.000	10.050		0.450		9.045
		2.000	9.400		0.450		8.460
	LS for beam and column projections	100.000					100.000
	deductions- RS1	-2*2.000	1.500		3.700		-22.200
	deductions- RS2	-2*2.000	2.900		3.700		-42.920
	deductions- Door D	-2.000	1.100		2.100		-4.620
	deductions- Door D1	-1.000	0.800		2.100		-1.680
	deductions- Window W	-6.000	1.500		1.500		-13.500
	deductions- Window W1	-3.000	1.000		1.500		-4.500
	deductions- Ventilator V	-1.000	0.600		0.600		-0.360
	deductions-wall tile w/c	-1.000	2*(1.05+1.2)		1.500		-6.750
	deductions-Wash area	-1.000	2.000		0.700		-1.400
	Total						**762.075**
						Total Quantity in sqm	**762.075**
1.041	13.52.1						
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work						
	Epoxy paint						
	RS1	2*2.000	1.500		3.700	1.100000	24.420

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	RS2	2*2.000	2.900		3.700	1.100000	47.212
	Grill	3.000	2.800		4.100	1.000000	34.440
	Total						**106.072**
						Total Quantity in sqm	**106.072**
1.042	17.3.1						
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.C. pan with ISI marked white solid plastic seat and lid						
	WC						
	Water Closet	1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
1.043	50.17.1.4						
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.						
	Health Faucet						
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.044	17.7.3						
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 550x400 mm with a pair of 15 mm C.P. brass pillar taps						
	Wash basin						
	Wash basin	3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.045	18.51.1						
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore						
	Bib cock						
	Bib cock	4.000					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.046	18.52.1						
	Providing and fixing C.P brass stop cock (concealed) of standard design and of approved make conforming to IS: 893115 mm nominal bore						
	Stop cock						
	For Health faucet and water closet	2.000					2.000
	For wash basin	3.000					3.000
	Total						**5.000**
						Total Quantity in each	**5.000**
1.047	17.73.1						
	Providing and fixing PTMT towel rail complete with brackets fixed to wooden cleats with CP brass screws with concealed fitting arrangement of approved quality and colour450 mm long towel rail with total length of 495 mm, 78 mm wide and effective height of 88 mm. weighing not less than 170 gms						
	Towel rail						
	For w/c & wash area	2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.048	17.74						
	Providing and fixing PTMT shelf 440 mm long, 124 mm width and 36 mm height of approved quality and colour, weighing not less than 300 gms.						
	PTMT Shelf						
	For Toilet	1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.049	18.65						
	Providing and fixing PTMT Soap Dish Holder having length of 138 mm, breadth 102 mm, height of 75 mm with concealed fittings arrangements, weighing not less than 106 gms.						
	Soap dish						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
1.050	17.71						
	Providing and fixing PTMT liquid soap container 109 mm wide, 125 mm high and 112 mm distance from wall of standard shape with bracket of the same materials with snap fittings of approved quality and colour, weighing not less than 105 gms						
	Fixing liquid soap container						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	liquid soap container	2.000					2.000
	Total						**2.000**
						Total Quantity in each	**2.000**
1.051	17.31						
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.						
	Fixing mirror						
	mirror	1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
1.052	18.48						
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.						
	Water tank						
	Water tank	1.000	1000.000				1000.000
	Total						**1000.000**
						Total Quantity in Litre	**1000.000**

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ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of office room cum harbour surveillance camera room-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Civil work**			
1.001	2.8.1			
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil			
	Net Total	293.071cum	@291.42/cum	85406.75
1.002	50.2.3.1			
	Pumping or Bailing out water and removing slush etc by using pump set including cost of labour, oil hire charges of pumpset, etc complete			
	Net Total	50.000hour	@279.29/hour	13964.50
1.003	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	36.210cum	@6687.21/cum	242143.87
1.004	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	43.200cum	@7069.78/cum	305414.50
1.005	50.2.25.1			
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge			
	Net Total	118.566cum	@515.98/cum	61177.68
1.006	4.1.6			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)			
	Net Total	26.348cum	@7076.05/cum	186439.77
1.007	60.7.2			

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Sl No	Specification	Quantity	Rate	Amount
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.			
	Net Total	4.969cum	@2557.65/cum	12708.96
1.008	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	71.603cum	@9237.20/cum	661411.23
1.009	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	90.338cum	@10858.36/cum	980922.53
1.010	5.34.1			
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	161.941cum	@80.55/cum	13044.35
1.011	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	235.330sqm	@329.03/sqm	77430.63
1.012	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	466.424sqm	@800.47/sqm	373358.42
1.013	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	342.073sqm	@637.63/sqm	218116.01

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Sl No	Specification	Quantity	Rate	Amount
1.014	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	171.640sqm	@847.44/sqm	145454.60
1.015	5.9.7			
	Centering and shuttering including strutting, etc. and removal of form for:Stairs, (excluding landings) except spiral - staircases)			
	Net Total	5.445sqm	@718.82/sqm	3913.97
1.016	OD5511/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR			
	Net Total	12987.040kilogram	@96.62/kilogram	1254807.80
1.017	50.6.7.2			
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.			
	Net Total	89.888cum	@7872.96/cum	707684.63
1.018	21.1.1.1			
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)			
	Net Total	539.600kg	@489.70/kg	264242.12
1.019	21.2.2			
	Providing and fixing 12 mm thick prelaminated particle board flat pressed three layer or graded wood particle board conforming to IS : 12823 Grade I Type II, in panelling fixed in aluminum doors, windows shutters and partition frames with C.P. brass / stainless steel screws etc. complete as per architectural drawings and directions of Engineer - in- Charge.Pre- laminated particle board with decorative lamination on both sides			
	Net Total	5.400sqm	@1209.19/sqm	6529.63
1.020	21.3.2			
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of			

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Sl No	Specification	Quantity	Rate	Amount
	aluminium snap beading shall be paid in basic item):With float glass panes of 5.50 mm thickness			
	Net Total	60.400sqm	@1497.40/sqm	90442.96
1.021	9.116			
	Providing and fixing sliding arrangement in racks/ cupboards/cabinets shutter by with stainless steel rollers to run inside C or E aluminium channel section (The payment of C or E channel shall be made separately			
	Net Total	48.000no	@17.12/no	821.76
1.022	9.117.1			
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 48x40 mm			
	Net Total	15.000metre	@256.03/metre	3840.45
1.023	9.118.1			
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).			
	Net Total	4.800sqm	@2033.68/sqm	9761.66
1.024	9.53			
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	96.000each	@207.00/each	19872.00
1.025	9.97.5			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:100x10 mm			
	Net Total	12.000no	@67.14/no	805.68

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Sl No	Specification	Quantity	Rate	Amount
1.026	9.88			
	Providing and fixing chromium plated brass 100 mm mortice latch and lock with 6 levers and a pair of lever handles of approved quality with necessary screws etc. complete.			
	Net Total	7.000no	@931.47/no	6520.29
1.027	50.9.15.1			
	Supplying and fixing 200 mm Aluminium aldrop			
	Net Total	3.000no	@171.51/no	514.53
1.028	10.6.1			
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover			
	Net Total	23.385sqm	@3400.57/sqm	79522.33
1.029	50.18.9.22.8			
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement -110 mm dia Vent cowl			
	Net Total	3.000no	@123.09/no	369.27
1.030	50.18.7.4.2			
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall			
	Net Total	60.000metre	@295.71/metre	17742.60
1.031	50.18.7.6.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 10 Kfg/cm - Internal work- Exposed on wall			
	Net Total	50.000metre	@409.92/metre	20496.00
1.032	50.18.9.4.2			
	Providing and fixing PVC pipes includings joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 32 mm dia 6 Kgf/cm2			
	Net Total	50.000metre	@218.52/metre	10926.00
1.033	50.18.9.9.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2			

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Sl No	Specification	Quantity	Rate	Amount
	Net Total	50.000metre	@521.14/metre	26057.00
1.034	50.18.9.13.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 25 mm dia 10 Kgf/cm2- External work - Exposed on wall			
	Net Total	50.000metre	@271.93/metre	13596.50
1.035	50.18.9.14.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - External work - Exposed on wall			
	Net Total	50.000metre	@305.29/metre	15264.50
1.036	50.18.9.18.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall			
	Net Total	50.000metre	@279.39/metre	13969.50
1.037	50.18.9.19.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/ clips/ at 1.00 m spacing . This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 mm dia 6 Kgf/cm2 - External work- Exposed on wall			
	Net Total	40.000metre	@379.40/metre	15176.00
1.038	13.1.1			
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	1063.447sqm	@308.22/sqm	327775.63
1.039	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	551.830sqm	@262.57/sqm	144894.00
1.040	11.36			
	Providing and fixing I st quality ceramic glazed wall tiles conforming to IS : 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer -in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3 kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.			
	Net Total	25.700sqm	@1190.03/sqm	30583.77
1.041	11.41.2			
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS :			

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Sl No	Specification	Quantity	Rate	Amount
	15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.			
	Net Total	361.322sqm	@1733.20/sqm	626243.29
1.042	13.47.1			
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)			
	Net Total	553.507sqm	@186.15/sqm	103035.33
1.043	13.48.1			
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm			
	Net Total	1036.070sqm	@164.22/sqm	170143.42
1.044	13.52.1			
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work			
	Net Total	51.447sqm	@219.17/sqm	11275.64
1.045	10.28			
	Providing and fixing stainless steel (Grade 304) railing made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners, stainless steel bolts etc., of required size on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.)			
	Net Total	77.480kg	@664.68/kg	51499.41
1.046	17.3.1			
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.C. pan with ISI marked white solid plastic seat and lid			
	Net Total	3.000each	@7721.48/each	23164.44
1.047	50.17.1.4			
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.			
	Net Total	3.000no	@758.07/no	2274.21
1.048	17.7.3			

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Sl No	Specification	Quantity	Rate	Amount
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 550x400 mm with a pair of 15 mm C.P. brass pillar taps			
	Net Total	3.000each	@3288.29/each	9864.87
1.049	18.51.1			
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore			
	Net Total	6.000each	@637.96/each	3827.76
1.050	18.52.1			
	Providing and fixing C.P brass stop cock (concealed) of standard design and of approved make conforming to IS: 893115 mm nominal bore			
	Net Total	9.000each	@700.27/each	6302.43
1.051	17.73.1			
	Providing and fixing PTMT towel rail complete with brackets fixed to wooden cleats with CP brass screws with concealed fitting arrangement of approved quality and colour450 mm long towel rail with total length of 495 mm, 78 mm wide and effective height of 88 mm. weighing not less than 170 gms			
	Net Total	2.000no	@641.43/no	1282.86
1.052	21.12.2			
	Providing and fixing aluminium tubular handle bar 32 mm outer dia, 3.0mm thick & 2100 mm long with S.S. screws etc. complete as per direction of Engineer -in-Charge.Powder coated minimum thickness 50 micron aluminium tubular handle bar			
	Net Total	14.000no	@649.84/no	9097.76
1.053	17.74			
	Providing and fixing PTMT shelf 440 mm long, 124 mm width and 36 mm height of approved quality and colour, weighing not less than 300 gms.			
	Net Total	3.000no	@741.89/no	2225.67
1.054	18.65			
	Providing and fixing PTMT Soap Dish Holder having length of 138 mm, breadth 102 mm, height of 75 mm with concealed fittings arrangements, weighing not less than 106 gms.			
	Net Total	4.000each	@150.72/each	602.88
1.055	17.71			
	Providing and fixing PTMT liquid soap container 109 mm wide, 125 mm high and 112 mm distance from wall of standard shape with bracket of the same materials with snap fittings of approved quality and colour, weighing not less than 105 gms			
	Net Total	2.000each	@183.17/each	366.34
1.056	17.10.1.2			
	Providing and fixing Stainless Steel A ISI 304 (18/8) kitchen sink as per IS 13983 with C.I. brackets and stainless steel plug 40 mm, including painting of fittings and brackets, cutting and making good the walls wherever required:			

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Sl No	Specification	Quantity	Rate	Amount
	Kitchen sink with drain board510x 1040 mm bowl depth 225 mm			
	Net Total	1.000each	@6758.95/each	6758.95
1.057	17.31			
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.			
	Net Total	2.000each	@1481.95/each	2963.90
1.058	18.48			
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.			
	Net Total	1000.000Litre	@10.18/Litre	10180.00
1.059	8.2.2.2			
	Providing and fixing 18 mm thick gang saw cut, mirror, polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations, of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.Area of slab over 0.50 sqm			
	Net Total	0.700sqm	@4629.02/sqm	3240.31
1.060	16.21			
	Engraving letters in hard stone			
	Net Total	400.000per Letter per cm height	@9.46/per Letter per cm height	3784.00
1.061	13.71			
	Lettering with black Japan pint of approved brand and manufacture			
	Net Total	600.000per Letter per cm height	@5.47/per Letter per cm height	3282.00
			Heading Total(Rs)	7514539.85
			Total Estimation PAC	7514539.85
3	**Extra Charges**			
2.001	Provision for GST			
		7514539.85	18.00%	1352617.17
			Grand Total	8867157.02
			Round off	32842.98
			Rounded Total(Rs)	8900000.00
	Rupees Eighty Nine Lakh			

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DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of office room cum harbour surveillance camera room-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Civil work						
1.001	2.8.1						
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil						
	Earth work						
	Footing 2.0x2.0	26.000	2.200	2.200	1.550		195.052
	Long wall	3.000	21.500	0.800	0.750		38.700
	Short wall	3.000	13.000	0.800	0.750		23.400
	Cross wall-rooms	3.000	4.000	0.800	0.750		7.200
	Toilet	3.000	1.500	0.800	0.750		2.700
	Step	1.000	5.000	0.600	0.150		0.450
	Ramp	1.000	6.000	1.500	0.150		1.350
	Septic Tank	1.000	6.000	2.500	1.500		22.500
	Soak pit	1.000	1.250	1.250	1.100		1.719
	Total						**293.071**
						Total Quantity in cum	**293.071**
1.002	50.2.3.1						
	Pumping or Bailing out water and removing slush etc by using pump set including cost of labour, oil hire charges of pumpset, etc complete						
	Pumping						
	For footing	50.000					50.000
	Total						**50.000**
						Total Quantity in hour	**50.000**
1.003	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	PCC						
	Footing 2.0x2.0	26.000	2.200	2.200	0.150		18.876
	Long wall	3.000	21.500	0.800	0.150		7.740

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Short wall	3.000	13.000	0.800	0.150		4.680
	Cross wall-rooms	3.000	4.000	0.800	0.150		1.440
	Toilet	3.000	1.500	0.800	0.150		0.540
	Step	1.000	5.000	0.600	0.150		0.450
	Septic Tank	1.000	6.000	2.500	0.150		2.250
	Soak pit	1.000	1.250	1.250	0.150		0.234
	Total						**36.210**
						Total Quantity in cum	**36.210**
1.004	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	RR masonry						
	Long wall	3.000	21.500	0.600	0.600		23.220
	Short wall	3.000	13.000	0.600	0.600		14.040
	Cross wall-rooms	3.000	4.000	0.600	0.600		4.320
	Toilet	3.000	1.500	0.600	0.600		1.620
	Total						**43.200**
						Total Quantity in cum	**43.200**
1.005	50.2.25.1						
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge						
	Filling						
	Entrance and stair room	1.000	13.000	3.600	0.450		21.060
	office room	1.000	4.000	6.000	0.450		10.800
	store room	1.000	4.000	4.000	0.450		7.200
	rest room	1.000	4.000	4.000	0.450		7.200
	toilet	2.000	1.500	1.200	0.450		1.620
	wash area	1.000	2.200	2.600	0.450		2.574
	cabin side	1.000	8.800	17.200	0.450		68.112
	Total						**118.566**
						Total Quantity in cum	**118.566**
1.006	4.1.6						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	CC Flooring						
	Entrance and stair room	1.000	13.000	3.600	0.100		4.680
	office room	1.000	4.000	6.000	0.100		2.400
	store room	1.000	4.000	4.000	0.100		1.600
	rest room	1.000	4.000	4.000	0.100		1.600
	toilet	2.000	1.500	1.200	0.100		0.360
	wash area	1.000	2.200	2.600	0.100		0.572
	cabin side	1.000	8.800	17.200	0.100		15.136
	Total						**26.348**
						Total Quantity in cum	**26.348**
1.007	60.7.2						
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.						
	DR packing						
	Septic tank	1.000	6.000	2.500	0.300		4.500
	Soak pit	1.000	1.250	1.250	0.300		0.469
	Total						**4.969**
						Total Quantity in cum	**4.969**
1.008	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	RCC- upto plinth level						
	Footing	26.000	2.000	2.000	0.200		20.800
		26.000	1/3	(2*2)+(0.5*0.5)+(2*0.5)	0.200		9.100
	Footing pedestal	26.000	0.500	0.500	1.000		6.500
	Stair bottom slab	1.000	1.500	1.000	0.120		0.180
	Plinth beam-Long wall	3.000	21.500	0.450	0.450		13.061
	Short wall	3.000	13.000	0.450	0.450		7.898
	Cross wall-rooms	3.000	4.000	0.450	0.450		2.430

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Toilet	3.000	1.500	0.450	0.450		0.911
	Ramp	1.000	6.000	1.500	(0.60+0.15)/2		3.375
	Soak pit	1.000	4*1.25	0.200	1.000		1.000
	Septic Tank -bed slab	1.000	6.000	2.500	0.150		2.250
	Septic Tank -side wall	2.000	2.100	0.200	1.100		0.924
	Septic Tank -side wall	2.000	0.600	0.200	1.100		0.264
	Septic Tank - baffle wall	2.000	2.100	0.150	0.800		0.504
	Septic Tank - cover slab	1.000	6.000	2.500	0.150		2.250
	Soak pit -cover slab	1.000	1.250	1.250	0.100		0.156
	Total						**71.603**
						Total Quantity in cum	**71.603**
1.009	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	Columns						
	GF	24.000	0.300	0.400	3.300		9.504
	Porch	2.000	0.300	0.400	3.300		0.792
	FF	8.000	0.300	0.400	3.000		2.880
	FF	16.000	0.300	0.400	0.800		1.536
	Total						**14.712**
	Lintel						
	GF-Long wall	3.000	21.500	0.200	0.150		1.935
	Short wall	3.000	13.000	0.200	0.150		1.170
	Cross wall-rooms	3.000	4.000	0.200	0.150		0.360
	Toilet	3.000	2.700	0.200	0.150		0.243
		1.000	5.000	0.300	0.150		0.225
	FF- Long wall	2.000	13.000	0.200	0.150		0.780
	Short wall	2.000	3.600	0.200	0.150		0.216

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**4.929**
	Beam						
	longitudinal	6+2	3.850	0.300	0.350		3.234
		6+2	3.600	0.300	0.350		3.024
		7+2	4.750	0.300	0.350		4.489
	transverse	4+4	3.500	0.300	0.350		2.940
		8.000	5.800	0.300	0.350		4.872
		4.000	2.300	0.300	0.350		0.966
	porch	2.000	4.400	0.300	0.350		0.924
	Total						**20.449**
	Roof slab						
	GF	1.000	22.000	13.600	0.120		35.904
	Deduct stair room	-1.000	8.000	3.600	0.120		-3.456
	porch	1.000	5.400	4.200	0.120		2.722
	FF	1.000	13.600	4.400	0.120		7.181
	Total						**42.351**
	Sunshade						
	GF -Long wall	2.000	22.600	0.600	(0.1+0.07)/2		2.305
	Short	2.000	13.400	0.600	(0.1+0.07)/2		1.367
	FF	1.000	22.400	0.600	(0.1+0.07)/2		1.142
		2.000	3.000	0.600	(0.1+0.07)/2		0.306
	Total						**5.120**
	Sunshade						
	waist slab	1.000	3.400	1.500	0.120		0.612
	waist slab	1.000	3.900	1.500	0.120		0.702
	waist slab	1.000	1.000	1.500	0.120		0.180
	step	22.000	0.300	1.500	.15/2		0.743
	landing	2.000	1.500	1.500	0.120		0.540
	Total						**2.777**
						Total Quantity in cum	**90.338**
1.010	5.34.1						
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Columns						
	GF	24.000	0.300	0.400	3.300		9.504
	Porch	2.000	0.300	0.400	3.300		0.792
	FF	8.000	0.300	0.400	3.000		2.880
	FF	16.000	0.300	0.400	0.800		1.536
	Total						**14.712**
	RCC- upto plinth level						
	Footing	26.000	2.000	2.000	0.200		20.800
		26.000	1/3	(2*2)+(0.5*0.5)+(2*0.5)	0.200		9.100
	Footing pedestal	26.000	0.500	0.500	1.000		6.500
	Stair bottom slab	1.000	1.500	1.000	0.120		0.180
	Plinth beam-Long wall	3.000	21.500	0.450	0.450		13.061
	Short wall	3.000	13.000	0.450	0.450		7.898
	Cross wall-rooms	3.000	4.000	0.450	0.450		2.430
	Toilet	3.000	1.500	0.450	0.450		0.911
	Ramp	1.000	6.000	1.500	(0.60+0.15)/2		3.375
	Soak pit	1.000	4*1.25	0.200	1.000		1.000
	Septic Tank -bed slab	1.000	6.000	2.500	0.150		2.250
	Septic Tank -side wall	2.000	2.100	0.200	1.100		0.924
	Septic Tank -side wall	2.000	0.600	0.200	1.100		0.264
	Septic Tank - baffle wall	2.000	2.100	0.150	0.800		0.504
	Septic Tank - cover slab	1.000	6.000	2.500	0.150		2.250
	Soak pit -cover slab	1.000	1.250	1.250	0.100		0.156
	Total						**71.603**
	Lintel						
	GF-Long wall	3.000	21.500	0.200	0.150		1.935
	Short wall	3.000	13.000	0.200	0.150		1.170
	Cross wall-rooms	3.000	4.000	0.200	0.150		0.360
	Toilet	3.000	2.700	0.200	0.150		0.243
		1.000	5.000	0.300	0.150		0.225
	FF- Long wall	2.000	13.000	0.200	0.150		0.780

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Short wall	2.000	3.600	0.200	0.150		0.216
	Total						**4.929**
	Beam						
	longitudinal	6+2	3.850	0.300	0.350		3.234
		6+2	3.600	0.300	0.350		3.024
		7+2	4.750	0.300	0.350		4.489
	transverse	4+4	3.500	0.300	0.350		2.940
		8.000	5.800	0.300	0.350		4.872
		4.000	2.300	0.300	0.350		0.966
	porch	2.000	4.400	0.300	0.350		0.924
	Total						**20.449**
	Roof slab						
	GF	1.000	22.000	13.600	0.120		35.904
	Deduct stair room	-1.000	8.000	3.600	0.120		-3.456
	porch	1.000	5.400	4.200	0.120		2.722
	FF	1.000	13.600	4.400	0.120		7.181
	Total						**42.351**
	Sunshade						
	GF -Long wall	2.000	22.600	0.600	(0.1+0.07)/2		2.305
	Short	2.000	13.400	0.600	(0.1+0.07)/2		1.367
	FF	1.000	22.400	0.600	(0.1+0.07)/2		1.142
		2.000	3.000	0.600	(0.1+0.07)/2		0.306
	Total						**5.120**
	Sunshade						
	waist slab	1.000	3.400	1.500	0.120		0.612
	waist slab	1.000	3.900	1.500	0.120		0.702
	waist slab	1.000	1.000	1.500	0.120		0.180
	step	22.000	0.300	1.500	.15/2		0.743
	landing	2.000	1.500	1.500	0.120		0.540
	Total						**2.777**
						Total Quantity in cum	**161.941**
1.011	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	Footing & foundations						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Footing PCC	4*26	2.200		0.150		34.320
	Footing RCC	4*26	2.000		.2+.2		83.200
	Pedestal	4*26	0.500		1.000		52.000
	PCC- Long wall	3.000	21.500		0.150		9.675
	Short wall	3.000	13.000		0.150		5.850
	Cross wall-rooms	3.000	4.000		0.150		1.800
	Toilet	3.000	1.500		0.150		0.675
	Step	1.000	5.000		0.150		0.750
	Septic Tank-bed slab	1.000	6+2.5		0.150		1.275
	Soak pit-bed slab	1.000	1.250+1.250		0.150		0.375
	Septic Tank -side wall	2*2	2.1+6		1.100		35.640
	Septic Tank - baffle wall	2*2	2.100		0.800		6.720
	Septic Tank - cover slab	2.000	6+2.5		0.150		2.550
	Soak pit -cover slab	4.000	1.250		0.100		0.500
	Total						**235.330**
						Total Quantity in sqm	**235.330**
1.012	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Slabs						
	Waist slab	2.000	3.400		0.120		0.816
		1.000	3.400	1.500			5.100
		2.000	1.000		0.120		0.240
		1.000	1.000	1.500			1.500
		2.000	3.900		0.120		0.936
		1.000	3.900	1.500			5.850
	Step	22.000	0.300		.15/2		0.495
	Landing	2.000	1.500	1.500			4.500
	Roof slab-GF	1.000	22.000	13.600			299.200
	Roof slab-GF	2.000	22+13.6		0.120		8.544
	Deduct stair room	-1.000	8.000	3.600			-28.800
	porch roof slab	1.000	5.400	4.200			22.680
	porch roof slab	2.000	5.400+4.2		0.120		2.304

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Roof slab- FF	1.000	13.600	4.400			59.840
	Roof slab- FF	2.000	13.6+4.4		0.120		4.320
	Total						**387.525**
	Sunshade						
	GF -Long wall	2.000	22.600	0.600			27.120
		1.000	22.600		(0.1+0.07)/2		1.921
	Short	2.000	13.400	0.600			16.080
		1.000	13.400		(0.1+0.07)/2		1.139
	FF	2.000	22.400	0.600			26.880
		1.000	22.400		(0.1+0.07)/2		1.904
		2.000	3.000	0.600			3.600
		1.000	3.000		(0.1+0.07)/2		0.255
	Total						**78.899**
						Total Quantity in sqm	**466.424**
1.013	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	Plinth beam						
	Plinth beam-Long wall	2*3.000	21.500		0.450		58.050
	Short wall	2*3.000	13.000		0.450		35.100
	Cross wall-rooms	2*3.000	4.000	0.450	0.450		4.860
	Toilet	2*3.000	1.500	0.450	0.450		1.823
	Total						**99.833**
	Lintel						
	GF-Long wall	2*3.000	21.500		0.150		19.350
	Short wall	2*3.000	13.000		0.150		11.700
	Cross wall-rooms	2*3.000	4.000		0.150		3.600
	Toilet	2*3.000	2.700		0.150		2.430
		2*1.000	5.000		0.150		1.500

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	FF- Long wall	2*2.000	13.000		0.150		7.800
	Short wall	2*2.000	3.600		0.150		2.160
	Total						**48.540**
	Beams						
	longitudinal	2*8	3.850		0.350		21.560
		8.000	3.850	0.300			9.240
		2*8	3.600		0.350		20.160
		8.000	3.600	0.300			8.640
		2*9	4.750		0.350		29.925
		9.000	4.750	0.300			12.825
	transverse	2*8	3.500		0.350		19.600
		7.000	3.500	0.300			7.350
		2*8.000	5.800		0.350		32.480
		8.000	5.800	0.300			13.920
		2*4.000	2.300		0.350		6.440
		4.000	2.300	0.300			2.760
	porch	2*2.000	4.400		0.350		6.160
		2.000	4.400	0.300			2.640
	Total						**193.700**
						Total Quantity in sqm	**342.073**
1.014	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	Columns						
	GF	24.000	(0.300+0.4)*2		3.300		110.880
	porch column	2.000	(0.300+0.4)*2		3.300		9.240
	FF	8.000	(0.300+0.4)*2		3.000		33.600
		16.000	(0.300+0.4)*2		0.800		17.920
	Total						**171.640**
						Total Quantity in sqm	**171.640**
1.015	5.9.7						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Centering and shuttering including strutting, etc. and removal of form for:Stairs, (excluding landings) except spiral - staircases)						
	Stair steps						
	Step	22.000	1.500		0.150		4.950
	Step	22.000	0.300		.15/2		0.495
	Total						**5.445**
						Total Quantity in sqm	**5.445**
1.016	OD5511/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR						
	Steel						
	LS Qty-80kg/m3 For item no.5	72.000				80.000 000	5760.000
	For item no.9	14.712				80.000 000	1176.960
	For item no.10	75.626				80.000 000	6050.080
	Total						**12987.040**
						Total Quantity in kilogram	**12987.040**
1.017	50.6.7.2						
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.						
	Laterite masonry						
	GF-Long wall	3.000	21.500	0.200	3.300		42.570
	Short wall	3.000	13.000	0.200	3.300		25.740
	Cross wall-rooms	3.000	4.000	0.200	3.300		7.920
	Toilet	3.000	2.700	0.200	3.300		5.346
	Step	1.000	5.000	0.600	0.300		0.900
		1.000	5.000	0.300	0.300		0.450
	FF- Long wall	2.000	13.000	0.200	3.000		15.600
	Parapet wall	1.000	17.26+13.4+17.26	0.150	0.800		5.750
	Toilet	3.000	2.700	0.200	3.300		5.346
	Rolling shutter	-1.000	4.600	0.200	3.000		-2.760
	Door-D	-2.000	1.200	0.200	2.100		-1.008
	D1	-5.000	1.000	0.200	2.100		-2.100
	Window	-12.000	1.500	0.200	1.500		-5.400

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	V1	-3.000	0.600	0.200	0.600		-0.216
	Glass panes	-2.000	3.700	0.200	1.500		-2.220
	Glass panes	-2.000	1.160	0.200	1.500		-0.696
	Glass panes	-2.000	3.500	0.200	1.500		-2.100
	Glass panes	-3.000	1.260	0.200	1.500		-1.134
	Glass panes	-1.000	2.100	0.200	1.500		-0.630
	Glass panes	-1.000	4.900	0.200	1.500		-1.470
	Total						**89.888**
						Total Quantity in cum	**89.888**
1.018	21.1.1.1						
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)						
	Aluminium door						
	Frame- Door D	2.000	5.400			2.000000	21.600
	Door D1	5.000	5.200			2.000000	52.000
	Shutter - Door D	2.000	8.400			1.000000	16.800
	Door D1	5.000	7.600			1.000000	38.000
	Window frame	12.000	4*(1.5+.8)			2.000000	220.800
	V1	3.000	4*0.600			2.000000	14.400
	Frames-Glass panes	2.000	2*(3.7+1.5)			2.000000	41.600
	Glass panes	2.000	2*(1.16+1.5)			2.000000	21.280
	Glass panes	2.000	2*(3.5+1.5)			2.000000	40.000
	Glass panes	3.000	2*(1.26+1.5)			2.000000	33.120

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Glass panes	1.000	2*(2.1+1.5)			2.000000	14.400
	Glass panes	1.000	2*(4.9+1.5)			2.000000	25.600
	Total						**539.600**
						Total Quantity in kg	**539.600**
1.019	21.2.2						
	Providing and fixing 12 mm thick prelaminated particle board flat pressed three layer or graded wood particle board conforming to IS : 12823 Grade I Type II, in panelling fixed in aluminum doors, windows shutters and partition frames with C.P. brass / stainless steel screws etc. complete as per architectural drawings and directions of Engineer - in- Charge.Pre- laminated particle board with decorative lamination on both sides						
	Panelling-Prelaminated particle board						
	Door D	2.000	1.000		0.900		1.800
	Door D1	5.000	0.800		0.900		3.600
	Total						**5.400**
						Total Quantity in sqm	**5.400**
1.020	21.3.2						
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 5.50 mm thickness						
	Glazing						
	Door-D	2.000	0.900		0.800		1.440
	D1	5.000	0.700		0.800		2.800
	Window	2*12.000	1.300		0.600		18.720
	V1	3.000	0.400		0.400		0.480
	Glass panes	2.000	3.600		1.400		10.080
	Glass panes	2.000	1.060		1.400		2.968
	Glass panes	2.000	3.400		1.400		9.520
	Glass panes	3.000	1.160		1.400		4.872
	Glass panes	1.000	2.000		1.400		2.800
	Glass panes	1.000	4.800		1.400		6.720
	Total						**60.400**
						Total Quantity in sqm	**60.400**
1.021	9.116						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing sliding arrangement in racks/ cupboards/cabinets shutter by with stainless steel rollers to run inside C or E aluminium channel section (The payment of C or E channel shall be made separately						
	Sliding arrangement						
	Windows	4*12					48.000
	Total						**48.000**
						Total Quantity in no	**48.000**
1.022	9.117.1						
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 48x40 mm						
	frame						
	D2	2*3	2.100				12.600
	D2	3.000	0.800				2.400
	Total						**15.000**
						Total Quantity in metre	**15.000**
1.023	9.118.1						
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).						
	Shutter						
	D2	3.000	0.800		2.000		4.800
	Total						**4.800**
						Total Quantity in sqm	**4.800**
1.024	9.53						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	Hold fast						
	Door	7*6				1.000000	42.000
	Window	12*4				1.000000	48.000
	V	3*2				1.000000	6.000
	Total						**96.000**
						Total Quantity in each	**96.000**
1.025	9.97.5						
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:100x10 mm						
	Tower bolt						
	Doors	12.000					12.000
	Total						**12.000**
						Total Quantity in no	**12.000**
1.026	9.88						
	Providing and fixing chromium plated brass 100 mm mortice latch and lock with 6 levers and a pair of lever handles of approved quality with necessary screws etc. complete.						
	Mortice latch						
	Doors	7.000					7.000
	Total						**7.000**
						Total Quantity in no	**7.000**
1.027	50.9.15.1						
	Supplying and fixing 200 mm Aluminium aldrop						
	Aluminium aldrop						
	For door D2	3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.028	10.6.1						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover						
	Rolling shutter						
	RS at entrance	1.000	4.600		3.000		13.800
	RS -FF	1.000	3.550		2.700		9.585
	Total						**23.385**
						Total Quantity in sqm	**23.385**
1.029	50.18.9.22.8						
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement -110 mm dia Vent cowl						
	Vent cowl						
	For toilet	3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.030	50.18.7.4.2						
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall						
	PVC Pipe						
	32mm	60.000					60.000
	Total						**60.000**
						Total Quantity in metre	**60.000**
1.031	50.18.7.6.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 10 Kfg/cm - Internal work- Exposed on wall						
	PVC Pipe						
	50mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.032	50.18.9.4.2						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing PVC pipes includings joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 32 mm dia 6 Kgf/cm2						
	PVC Pipe						
	32mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.033	50.18.9.9.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2						
	PVC Pipe						
	110mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.034	50.18.9.13.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 25 mm dia 10 Kgf/cm2- External work - Exposed on wall						
	PVC Pipe						
	25mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.035	50.18.9.14.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - External work - Exposed on wall						
	PVC Pipe						
	32mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.036	50.18.9.18.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall						
	PVC Pipe						
	75mm	50.000					50.000
	Total						**50.000**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in metre	**50.000**
1.037	50.18.9.19.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/ clips/ at 1.00 m spacing . This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 mm dia 6 Kgf/cm2 - External work- Exposed on wall						
	PVC Pipe						
	110mm	40.000					40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.038	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	Plastering-outside						
	GF	2.000	21.5+13.41		3.300		230.406
	FF	2.000	13.41+4		3.000		104.460
	Parapet wall	1.000	(17.26*2) +13.41		0.800+.8 +.10		81.481
	Car porch column	2*2.000	.3+.4		3.300		9.240
	FF- Columns	6.000	(0.3+0.4) *2		0.800		6.720
		6.000	0.300	0.400			0.720
	Sunshade-GF - Long wall	2*2.000	22.600	0.600			54.240
	Short	2*2.000	13.400	0.600			32.160
	FF	2*1.000	22.400	0.600			26.880
		2*2.000	3.000	0.600			7.200
	Total						**553.507**
	Inside						
	Entrance & Stair room	2.000	13+3.6		3.300		109.560
	office room	2.000	4+6		3.300		66.000
	store room	2.000	4+4		3.300		52.800
	rest room	2.000	4+4		3.300		52.800
	toilet	2*3	1.5+1.2		3.300		53.460
	wash area	2.000	2.2+2.6		3.300		31.680
	cabin side	2.000	8.8+17.2		3.300		171.600

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	FF	2.000	13+3.6		3.000		99.600
	Column sides	3.000	(0.3+0.4) *2		3.300		13.860
	Total						**651.360**
	Deductions						
	Rolling shutter	-2*1.000	4.600		3.000	1.000000	-27.600
	Door-D	-2.000	1.200		2.100	1.000000	-5.040
	D1	-5.000	1.000		2.100	1.000000	-10.500
	Window	-12.000	1.500		1.500	1.000000	-27.000
	V1	-3.000	0.600		0.600	1.000000	-1.080
	Glass panes	-2*2.000	3.700		1.500	1.000000	-22.200
	Glass panes	-2.000	1.160		1.500	1.000000	-3.480
	Glass panes	-2*2.000	3.500		1.500	1.000000	-21.000
	Glass panes	-3.000	1.260		1.500	1.000000	-5.670
	Glass panes	-1.000	2.100		1.500	1.000000	-3.150
	Glass panes	-2*1.000	4.900		1.500	1.000000	-14.700
	Total						**-141.420**
						Total Quantity in sqm	**1063.447**
1.039	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	Ceiling plastering						
	Entrance and stair room	1.000	13.000	3.600			46.800
	office room	1.000	4.000	6.000			24.000
	store room	1.000	4.000	4.000			16.000
	rest room	1.000	4.000	4.000			16.000
	toilet	2.000	1.500	1.200			3.600
	wash area	1.000	2.200	2.600			5.720

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	cabin side	1.000	8.800	17.200			151.360
	FF	2.000	13.000	3.600			93.600
	Beams-longitudinal	6+2	3.850		.35+.3+.35		30.800
		6+2	3.600		.35+.3+.35		28.800
		7+2	4.750		.35+.3+.35		42.750
	transverse	4+4	3.500		.35+.3+.35		28.000
		8.000	5.800		.35+.3+.35		46.400
		4.000	2.300		.35+.3+.35		9.200
	porch	2.000	4.400		.35+.3+.35		8.800
	Total						**551.830**
						Total Quantity in sqm	**551.830**
1.040	11.36						
	Providing and fixing I st quality ceramic glazed wall tiles conforming to IS : 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer -in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3 kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.						
	Wall tiles						
	Toilet	2*3.000	1.5+1.2		1.500		24.300
	Wash area	1.000	2.000		0.700		1.400
	Total						**25.700**
						Total Quantity in sqm	**25.700**
1.041	11.41.2						
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.						
	Floor Tile						
	Entrance and stair room	1.000	13.000	3.600			46.800
	office room	1.000	4.000	6.000			24.000
	store room	1.000	4.000	4.000			16.000
	rest room	1.000	4.000	4.000			16.000

EST No. :HED/CEHED/EST/105/2022_5_13_12 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	toilet	2.000	1.500	1.200			3.600
	wash area	1.000	2.200	2.600			5.720
	cabin side	1.000	8.800	17.200			151.360
	FF	1.000	13.000	3.600			46.800
	For Skirting - 15% of floor area	46.8+24+16+16+3.6+5.72+151.36+46.8				0.150000	46.542
	Step	2.000	5.000	0.300			3.000
		2.000	5.000		0.150		1.500
	Total						**361.322**
						Total Quantity in sqm	**361.322**
1.042	13.47.1						
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)						
	Exterior Paint						
	GF	2.000	21.5+13.41		3.300		230.406
	FF	2.000	13.41+4		3.000		104.460
	Parapet wall	1.000	(17.26*2)+13.41		0.800+.8+.10		81.481
	Car porch column	2*2.000	.3+.4		3.300		9.240
	FF- Columns	6.000	(0.3+0.4)*2		0.800		6.720
		6.000	0.300	0.400			0.720
	Sunshade-GF - Long wall	2*2.000	22.600	0.600			54.240
	Short	2*2.000	13.400	0.600			32.160
	FF	2*1.000	22.400	0.600			26.880
		2*2.000	3.000	0.600			7.200
	Total						**553.507**
						Total Quantity in sqm	**553.507**
1.043	13.48.1						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm						
	Interior Paint						
	Entrance & Stair room	2.000	13+3.6		3.300		109.560
	office room	2.000	4+6		3.300		66.000
	store room	2.000	4+4		3.300		52.800
	rest room	2.000	4+4		3.300		52.800
	toilet	2*3	1.5+1.2		3.300		53.460
	wash area	2.000	2.2+2.6		3.300		31.680
	cabin side	2.000	8.8+17.2		3.300		171.600
	FF	2.000	13+3.6		3.000		99.600
	Column sides	3.000	(0.3+0.4) *2		3.300		13.860
	Deductions-Rolling shutter	-2*1.000	4.600		3.000		-27.600
	Door-D	-2.000	1.200		2.100		-5.040
	D1	-5.000	1.000		2.100		-10.500
	Window	-12.000	1.500		1.500		-27.000
	V1	-3.000	0.600		0.600		-1.080
	Glass panes	-2*2.000	3.700		1.500		-22.200
	Glass panes	-2.000	1.160		1.500		-3.480
	Glass panes	-2*2.000	3.500		1.500		-21.000
	Glass panes	-3.000	1.260		1.500		-5.670
	Glass panes	-1.000	2.100		1.500		-3.150
	Glass panes	-2*1.000	4.900		1.500		-14.700
	Toilet- wall tile	-2*3	1.5+1.2		1.500		-24.300
	wash area- wall tile	-1.000	2.000		0.700		-1.400
	Ceiling- Entrance and stair room	1.000	13.000	3.600			46.800
	office room	1.000	4.000	6.000			24.000
	store room	1.000	4.000	4.000			16.000

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rest room	1.000	4.000	4.000			16.000
	toilet	2.000	1.500	1.200			3.600
	wash area	1.000	2.200	2.600			5.720
	cabin side	1.000	8.800	17.200			151.360
	FF	2.000	13.000	3.600			93.600
	Beams-longitudinal	6+2	3.850		.35+.3+.35		30.800
		6+2	3.600		.35+.3+.35		28.800
		7+2	4.750		.35+.3+.35		42.750
	transverse	4+4	3.500		.35+.3+.35		28.000
		8.000	5.800		.35+.3+.35		46.400
		4.000	2.300		.35+.3+.35		9.200
	porch	2.000	4.400		.35+.3+.35		8.800
	Total						**1036.070**
						Total Quantity in sqm	**1036.070**
1.044	13.52.1						
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work						
	Epoxy paint						
	RS at entrance	2.000	4.600		3.000	1.100000	30.360
	RS -FF	2.000	3.550		2.700	1.100000	21.087
	Total						**51.447**
						Total Quantity in sqm	**51.447**
1.045	10.28						
	Providing and fixing stainless steel (Grade 304) railing made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners, stainless steel bolts etc., of required size on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.)						
	Hand Rail						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	50mm Pipe	1.000	10.000			2.400000	24.000
	40mm Pipe	10.000	0.800			1.910000	15.280
		2.000	10.000			1.910000	38.200
	Total						**77.480**
						Total Quantity in kg	**77.480**
1.046	17.3.1						
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.C. pan with ISI marked white solid plastic seat and lid						
	WC						
	Water Closet	3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.047	50.17.1.4						
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.						
	Health Faucet						
		3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.048	17.7.3						
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 550x400 mm with a pair of 15 mm C.P. brass pillar taps						
	Wash basin						
	Wash basin	3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.049	18.51.1						
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore						
	Bib cock						
	Bib cock	6.000					6.000

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**6.000**
						Total Quantity in each	**6.000**
1.050	18.52.1						
	Providing and fixing C.P brass stop cock (concealed) of standard design and of approved make conforming to IS: 893115 mm nominal bore						
	Stop cock						
	For Health faucet and water closet	3*2					6.000
	For wash basin	3.000					3.000
	Total						**9.000**
						Total Quantity in each	**9.000**
1.051	17.73.1						
	Providing and fixing PTMT towel rail complete with brackets fixed to wooden cleats with CP brass screws with concealed fitting arrangement of approved quality and colour450 mm long towel rail with total length of 495 mm, 78 mm wide and effective height of 88 mm. weighing not less than 170 gms						
	Towel rail						
	For wash room	2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.052	21.12.2						
	Providing and fixing aluminium tubular handle bar 32 mm outer dia, 3.0mm thick & 2100 mm long with S.S. screws etc. complete as per direction of Engineer -in-Charge.Powder coated minimum thickness 50 micron aluminium tubular handle bar						
	Aluminium handle bar						
	For doors	7*2					14.000
	Total						**14.000**
						Total Quantity in no	**14.000**
1.053	17.74						
	Providing and fixing PTMT shelf 440 mm long, 124 mm width and 36 mm height of approved quality and colour, weighing not less than 300 gms.						
	PTMT Shelf						
	For Toilet	3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.054	18.65						
	Providing and fixing PTMT Soap Dish Holder having length of 138 mm, breadth 102 mm, height of 75 mm with concealed fittings arrangements, weighing not less than 106 gms.						
	Soap dish						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		4.000					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**
1.055	17.71						
	Providing and fixing PTMT liquid soap container 109 mm wide, 125 mm high and 112 mm distance from wall of standard shape with bracket of the same materials with snap fittings of approved quality and colour, weighing not less than 105 gms						
	Fixing liquid soap container						
	liquid soap container	2.000					2.000
	Total						**2.000**
						Total Quantity in each	**2.000**
1.056	17.10.1.2						
	Providing and fixing Stainless Steel A ISI 304 (18/8) kitchen sink as per IS 13983 with C.I. brackets and stainless steel plug 40 mm, including painting of fittings and brackets, cutting and making good the walls wherever required: Kitchen sink with drain board510x 1040 mm bowl depth 225 mm						
	Kitchen sink						
	In rest room	1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
1.057	17.31						
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.						
	Fixing mirror						
	mirror	2.000					2.000
	Total						**2.000**
						Total Quantity in each	**2.000**
1.058	18.48						
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.						
	Water tank						
	Water tank	1.000	1000.000				1000.000
	Total						**1000.000**
						Total Quantity in Litre	**1000.000**
1.059	8.2.2.2						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing 18 mm thick gang saw cut, mirror, polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations, of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.Area of slab over 0.50 sqm						
	Inauguration stones						
	Inauguration stone	1.000	1.000	0.700			0.700
	Total						**0.700**
						Total Quantity in sqm	**0.700**
1.060	16.21						
	Engraving letters in hard stone						
	Engraving on the inauguration stone						
	For inauguration stone	200.000			2.000		400.000
	Total						**400.000**
						Total Quantity in per Letter per cm height	**400.000**
1.061	13.71						
	Lettering with black Japan pint of approved brand and manufacture						
	For lettering on Office Name Board						
	say 200Letters	200.000			3.000		600.000
	Total						**600.000**
						Total Quantity in per Letter per cm height	**600.000**

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ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Water Supply Arrangements in the Harbour-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Construction of OH RCC Water Tank and Pump House**			
1.001	2.31			
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared			
	Net Total	400.000sqm	@14.48/sqm	5792.00
1.002	OD1292/2022-2023			
	Chipping and removing top of RCC piles to lines and levels carefully without damaging remaining portion of pile and removing debris upto a distance of 150 m including all labour charges , hire of equipments etc.complete as per directions of departmental officers at site Unit- cum Taking output - 1.25 cum			
	Net Total	2.543cum	@3537.94/cum	8996.98
1.003	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	65.340cum	@210.02/cum	13722.71
1.004	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	6.534cum	@6687.21/cum	43694.23
1.005	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	33.074cum	@9237.20/cum	305511.15
1.006	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content			

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Sl No	Specification	Quantity	Rate	Amount
	as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	88.000cum	@10858.36/cum	955535.68
1.007	5.34.1			
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	121.074cum	@80.55/cum	9752.51
1.008	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	38.280sqm	@329.03/sqm	12595.27
1.009	OD5503/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - HCR Fe-500D or more			
	Net Total	13858.800kg	@96.62/kg	1339037.26
1.010	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	179.280sqm	@847.44/sqm	151929.04
1.011	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	200.160sqm	@800.47/sqm	160222.08
1.012	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	133.770sqm	@637.63/sqm	85295.77
1.013	50.6.7.2			
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.			
	Net Total	12.900cum	@7872.96/cum	101561.18
1.014	9.143			
	Providing and fixing factory made uPVC door frame, made of uPVC extruded			

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Sl No	Specification	Quantity	Rate	Amount
	section, of size 65 mm x 55 mm with wall thickness 2.0 mm (? 0.2mm), corners of the door frame to be mitred cut and jointed with plastic brackets and stainless steel screws, reinforcing hinge side vertical of the frames with PVC profile of Size 28 mm x 30 mm having wall thickness 2 mm (? 0.2 mm), including providing & fixing 3 nos of 125 mm long stainless steel hinges to the frame, fixing the frame with jamb with required number & size of anchor dash fastners, all complete as per manufacturer's specification and direction of Engineer-in-charge.			
	Net Total	6.500metre	@610.23/metre	3966.50
1.015	9.142.2			
	35 mm thick factory made Solid panel PVC Door shutter, made out of single piece extruded solid PVC (±0.2 mm) thick, having styles & rails (except lock rail) of size 95 mmx 35 mm x 5 mm, out of which 75 mm shall be flat and 20 mm shall be tapered (on both side), having one side thickness of 15 mm integrally extruded on the hinges side of the profile for better screw holding power, including reinforcing with MS tube of size 40 mm x 20 mm x 1 mm, joints of styles & rails to be mitered cut & joint with the help of PVC solvent cement, self driven self tapping screws & M.S. rectangular pipes bracket of size 190 mm x 100 mm of cross section size 35 mm x 17 mm s 1 mm at each corner. Single piece extruded 5 mm thick solid PVC Lock rail of size 115 mm x 35 mm x 35 mm, out of which 95 mm to be flat and 20 mm to be tapered at both ends, having 15 mm solid core in middle of rail section integrally extruded, fixing the styles & rails with the help of solvent and self driven self tapping screws of 125 mm x 11 mm, including providing 5 mm Single piece solid PVC extruded sheet inserted in the door as panel, all complete as per manufacturer's specification and direction of Engineer-in-charge.Decorative finish (wood grained finish)			
	Net Total	2.100sqm	@4438.67/sqm	9321.21
1.016	9.147.5			
	Providing and fixing factory made uPVC white colour casement/casement cum fixed glazed windows comprising of uPVC multi-chambered frame, sash and mullion (where ever required) extruded profiles duly reinforced with 1.60 +/- 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), uPVC extruded glazing beads of appropriate dimension, EPDM gasket, stainless steel (SS 304 grade) friction hinges, zinc alloy (white powder coated) casement handles, G.I fasteners 100 x 8 mm size for fixing frame to finished wall, plastic packers, plastic caps and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, mullion (if required) shall be also fusion welded including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, all complete as per approved drawing & direction of Engineer-in-Charge. (Single / double glass panes and silicon sealant shall be paid separately) Note: For uPVC frame, sash and mullion extruded profiles minus 5% tolerance in dimension i.e. in depth & width of profile shall be acceptable.Casement window double panels with S.S. friction hinges (350 x 19 x 1.9 mm) made of (big series)frame 67 x 60 mm & sash / mullion 67 x 80 mm both having wall thickness of 2.3 ± 0.2 mm and single glazing bead/ double glazing bead of appropriate dimension. (Area of window above 1.50 sqm).			
	Net Total	3.000sqm	@11164.86/sqm	33494.58

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Sl No	Specification	Quantity	Rate	Amount
1.017	9.7.7.1			
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick: Float glass panes4 mm thick glass pane			
	Net Total	2.240sqm	@2070.48/sqm	4637.88
1.018	9.100.2			
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm			
	Net Total	2.000no	@61.02/no	122.04
1.019	9.97.3			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm			
	Net Total	4.000no	@103.95/no	415.80
1.020	50.9.15.2			
	Supplying and fixing 300 mm Aluminium aldrop			
	Net Total	1.000no	@188.93/no	188.93
1.021	13.7.2			
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	577.730sqm	@379.14/sqm	219040.55
1.022	13.15			
	20 mm cement plaster 1:2 (1 cement : 2 stone dust)			
	Net Total	3.000sqm	@476.55/sqm	1429.65
1.023	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	151.640sqm	@262.57/sqm	39816.11
1.024	10.25.2			
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works			
	Net Total	4000.000kg	@151.29/kg	605160.00
1.025	13.43.1			
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer			

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Sl No	Specification	Quantity	Rate	Amount
	Net Total	729.370sqm	@69.33/sqm	50567.22
1.026	13.60.1			
	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade:Two or more coats on new work			
	Net Total	729.370sqm	@148.59/sqm	108377.09
1.027	50.18.9.9.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2			
	Net Total	150.000metre	@521.14/metre	78171.00
1.028	50.18.8.8.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 75 mm pipe 6 Kgf/cm2			
	Net Total	20.000metre	@614.17/metre	12283.40
1.029	18.17.5			
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :65 mm nominal bore			
	Net Total	5.000each	@1718.82/each	8594.10
1.030	50.18.9.8.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2			
	Net Total	1000.000metre	@356.56/metre	356560.00
1.031	50.18.7.4.2			
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall			
	Net Total	750.000metre	@295.71/metre	221782.50
1.032	18.17.2			
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :32 mm nominal bore			
	Net Total	10.000each	@671.37/each	6713.70
1.033	18.32.1			
	Constructing masonry chamber 30x30x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for stop cock, with C.I. surface box 100x100x75 mm (inside) with hinged cover fixed in cement concrete slab 1:2:4 mix (1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm			

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S (non modular) bricks of class designation 7.5			
	Net Total	3.000each	@1827.73/each	5483.19
1.034	50.18.9.21.4			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend			
	Net Total	10.000no	@87.89/no	878.90
1.035	50.18.9.21.9			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling			
	Net Total	5.000no	@72.21/no	361.05
1.036	18.59.2			
	Providing and fixing C.I double acting air valve of approved quality with bolts, nuts, rubber insertion etc. complete (The tail pieces, tapers etc. if required will be paid separately):80 mm dia			
	Net Total	3.000no	@7208.30/no	21624.90
1.037	50.18.9.6.2			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2			
	Net Total	100.000metre	@240.68/metre	24068.00
1.038	50.18.9.21			
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Elbow			
	Net Total	10.000no	@94.28/no	942.80
1.039	50.18.9.21.5			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee			
	Net Total	10.000no	@94.65/no	946.50
1.040	18.15.2			
	Providing and fixing brass bib cock of approved quality :20 mm nominal bore			
	Net Total	20.000each	@377.04/each	7540.80
1.041	18.60.1			
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore			
	Net Total	1.000each	@4130.60/each	4130.60
			Heading Total(Rs)	5020264.86

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Sl No	Specification	Quantity	Rate	Amount
2	**Pile liners and miscellaneous items for piling**			
2.001	12.22			
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.			
	Net Total	4.033MT	@125636.20/MT	506690.79
2.002	OD1321/2022-2023			
	Driving down vertically M.s Liner already fabricated to the required depth by power winch and accessories including all hire charge of machinery , labour charges etc complete			
	Net Total	45.000metre	@568.30/metre	25573.50
2.003	OD1325/2022-2023			
	Supply, Fitting and Placing in position reinforcement in cages using HCR bar Reinforcement including cost of materials, labour charges, conveyance and placing the cages in bore holes providing precast cover blocks etc, complete as per Drawing and Technical Specificationsand as directed by Engineer in charge excluding cost of welding charges. Unit = 1 MT Taking output = 1 MT a) Material			
	Net Total	38.565tonne	@98321.63/tonne	3791773.66
2.004	12.23.3			
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm			
	Net Total	225.000metre	@7210.41/metre	1622342.25
			Heading Total(Rs)	5946380.20
3	**Construction of Sump**			
3.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	65.340cum	@210.02/cum	13722.71
3.002	60.7.4			
	DR PACKING FOR APRONS - Rough stone dry packing for apron with good quality blasted rubble including packing to compactness to lines levels, cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site			
	Net Total	19.602cum	@3557.50/cum	69734.12
3.003	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4			

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	6.534cum	@6687.21/cum	43694.23
3.004	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	3.960sqm	@329.03/sqm	1302.96
3.005	5.9.2			
	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.			
	Net Total	125.600sqm	@703.77/sqm	88393.51
3.006	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	34.020sqm	@800.47/sqm	27231.99
3.007	5.1.2			
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size			
	Net Total	8.000cum	@8914.94/cum	71319.52
3.008	5.2.2			
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)			
	Net Total	13.000cum	@10748.82/cum	139734.66
3.009	5.3			
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).			
	Net Total	6.000cum	@11277.61/cum	67665.66
3.010	5.22.1			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelMild steel and Medium Tensile steel bars			
	Net Total	640.000kg	@94.84/kg	60697.60
3.011	5.22A.1			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Mild steel and Medium			

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Sl No	Specification	Quantity	Rate	Amount
	Tensile steel bars			
	Net Total	2160.000kilogram	@94.84/kilogram	204854.40
3.012	50.13.1			
	9 mm cement plastering of mix : 1:3 (1 cement : 3 fine sand) including all cost of materials, labour charges etc complete			
	Net Total	59.200sqm	@285.84/sqm	16921.73
3.013	13.9.1			
	Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster			
	Net Total	66.400sqm	@404.42/sqm	26853.49
3.014	50.18.9.19.2			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 m dia 4 Kgf/cm2 - External work - Exposed on wall			
	Net Total	10.000metre	@329.39/metre	3293.90
3.015	50.18.9.8.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2			
	Net Total	50.000metre	@356.56/metre	17828.00
3.016	50.18.9.18.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall			
	Net Total	50.000metre	@279.39/metre	13969.50
3.017	50.18.7.6.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing . This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 6 Kgf/cm2 - Internal work- Exposed on wall			
	Net Total	20.000metre	@369.84/metre	7396.80
3.018	50.18.9.6.2			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2			
	Net Total	20.000metre	@240.68/metre	4813.60
3.019	50.18.9.21.4			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend			

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EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	5.000no	@87.89/no	439.45
3.020	50.18.9.21.5			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee			
	Net Total	5.000no	@94.65/no	473.25
3.021	50.18.9.21.8			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75 mm dia End cap			
	Net Total	1.000no	@64.08/no	64.08
3.022	50.18.9.21.9			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling			
	Net Total	2.000no	@72.21/no	144.42
3.023	18.37.1			
	Constructing masonry chamber 60x45x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for water meter complete with C.I double flap surface box 400x200x200 mm (inside) with locking arrangement and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 grades stone aggregate 20 nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S. (non modular) bricks of class designation 7.5			
	Net Total	1.000each	@9587.28/each	9587.28
3.024	18.60.1			
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore			
	Net Total	1.000each	@4130.60/each	4130.60
			Heading Total(Rs)	894267.46
			Total Estimation PAC	11860912.52
Sl No	**Description**		**Percentage/LS**	**Amount**
4	**Lumsum Heading**			
4.001	LS provision for part TS			
		0.00	0.00%	2000000.00
4.002	Water connection charges (KWA)			
		0.00	0.00%	1000000.00
4.003	LS Amount for Electrification			
		0.00	0.00%	1900000.00
			Total Lumsum Amount	4900000.00

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(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
5	**Extra Charges**			
4.001	Provision for GST			
		11860912.52	18.00%	2134964.25
			Grand Total	18895876.77
			Round off	4123.23
			Rounded Total(Rs)	18900000.00
	Rupees One Crore Eighty Nine Lakh			

ePRICE
ePLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Water Supply Arrangements in the Harbour-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Construction of OH RCC Water Tank and Pump House						
1.001	2.31						
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared						
	site clearance						
		1.000	20.000	20.000			400.000
	Total						**400.000**
						Total Quantity in sqm	**400.000**
1.002	OD1292/2022-2023						
	Chipping and removing top of RCC piles to lines and levels carefully without damaging remaining portion of pile and removing debris upto a distance of 150 m including all labour charges , hire of equipments etc.complete as per directions of departmental officers at site Unit- cum Taking output - 1.25 cum						
	for pile						
		9.000	3.140/4	.6*.6	1.000	1.000000	2.543
	Total						**2.543**
						Total Quantity in cum	**2.543**
1.003	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	for pile cap						
		1.000	6.600	6.600	1.500		65.340
	Total						**65.340**
						Total Quantity in cum	**65.340**
1.004	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	for pile pcc						
		1.000	6.600	6.600	0.150		6.534
	Total						**6.534**

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(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**6.534**
1.005	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	column upto GL and footing						
	column upto GL	9.000	0.600	0.600	0.700		2.268
	Raft	1.000	6.400	6.400	0.750		30.720
	rounding	1.000	0.086				0.086
	Total						**33.074**
						Total Quantity in cum	**33.074**
1.006	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	columns and walls						
	column from GL to top	9.000	0.400	0.400	12.450		17.928
	Wall of water tank	2.000	6.000	0.250	3.000		9.000
		2.000	5.600	0.250	3.000		8.400
	rounding	1.000	2.672				2.672
	Total						**38.000**
	Beams and slab						
	tie beams	12*3	2.400	0.300	0.300		7.776
	haunch	24*3	0.300	0.300	0.300		1.944
	bottom slab for tank	1.000	7.600	7.600	0.250		14.440
	bottom beam for slab	3.000	6.000	0.300	0.300		1.620
		3.000	5.100	0.300	0.300		1.377

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	top slab cover	1.000	6.000	6.000	0.120		4.320
	slab on GF	1.000	7.600	7.600	0.150		8.664
	slab projections	2*4	7.600	0.800	0.150		7.296
	lintel GF	1.000	6.000	0.200	0.200		0.240
	sunshade GF	1.000	6.000	0.600	0.100		0.360
	rounding	1.000	1.963				1.963
	Total						**50.000**
						Total Quantity in cum	**88.000**
1.007	5.34.1						
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	column upto GL and footing						
	column upto GL	9.000	0.600	0.600	0.700		2.268
	Raft	1.000	6.400	6.400	0.750		30.720
	rounding	1.000	0.086				0.086
	Total						**33.074**
	columns and walls						
	column from GL to top	9.000	0.400	0.400	12.450		17.928
	Wall of water tank	2.000	6.000	0.250	3.000		9.000
		2.000	5.600	0.250	3.000		8.400
	rounding	1.000	2.672				2.672
	Total						**38.000**
	Beams and slab						
	tie beams	12*3	2.400	0.300	0.300		7.776
	haunch	24*3	0.300	0.300	0.300		1.944
	bottom slab for tank	1.000	7.600	7.600	0.250		14.440
	bottom beam for slab	3.000	6.000	0.300	0.300		1.620
		3.000	5.100	0.300	0.300		1.377
	top slab cover	1.000	6.000	6.000	0.120		4.320
	slab on GF	1.000	7.600	7.600	0.150		8.664
	slab projections	2*4	7.600	0.800	0.150		7.296
	lintel GF	1.000	6.000	0.200	0.200		0.240
	sunshade GF	1.000	6.000	0.600	0.100		0.360

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	1.963				1.963
	Total						**50.000**
						Total Quantity in cum	**121.074**
1.008	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	for pile cap						
	for pcc	4.000	6.600		0.150		3.960
	for pile cap	4.000	6.400		0.750		19.200
	column upto GL	9.000	2.400		0.700		15.120
	Total						**38.280**
						Total Quantity in sqm	**38.280**
1.009	OD5503/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - HCR Fe-500D or more						
	Reinforcement						
		1.000	38.000			120.000000	4560.000
		1.000	50.000			120.000000	6000.000
	Total						**10560.000**
	column						
	column upto GL	9.000	0.600	0.600	0.700	100.000000	226.800
	Raft	1.000	6.400	6.400	0.750	100.000000	3072.000
	Total						**3298.800**
						Total Quantity in kg	**13858.800**
1.010	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	column						
		9.000	1.600		12.450		179.280
	Total						**179.280**
						Total Quantity in sqm	**179.280**
1.011	5.9.3						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	slabs						
	bottom slab for tank	1.000	7.600	7.600			57.760
	top slab cover	1.000	6.000	6.000			36.000
	slab on GF	1.000	7.600	7.600			57.760
	slab projections	2*4	7.600	0.800			48.640
	Total						**200.160**
						Total Quantity in sqm	**200.160**
1.012	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	beams						
	tie beams	12*3	2.400	0.900			77.760
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	lintel GF	1.000	6.000	0.400			2.400
	Sunshade GF	1.000	6.000	0.700			4.200
	Total						**133.770**
						Total Quantity in sqm	**133.770**
1.013	50.6.7.2						
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.						
	Pump house at GF						
	long wall	2.000	6.000	0.200	3.000		7.200
	cross wall	2.000	5.600	0.200	3.000		6.720
	Total						**13.920**
	deduction						
	door	-1.000	1.000	0.200	2.100		-0.420
	window	-1.000	2.000	0.200	1.500		-0.600
	Total						**-1.020**
						Total Quantity in cum	**12.900**
1.014	9.143						

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing factory made uPVC door frame, made of uPVC extruded section, of size 65 mm x 55 mm with wall thickness 2.0 mm (? 0.2mm), corners of the door frame to be mitred cut and jointed with plastic brackets and stainless steel screws, reinforcing hinge side vertical of the frames with PVC profile of Size 28 mm x 30 mm having wall thickness 2 mm (? 0.2 mm), including providing & fixing 3 nos of 125 mm long stainless steel hinges to the frame, fixing the frame with jamb with required number & size of anchor dash fastners, all complete as per manufacturer's specification and direction of Engineer-in-charge.						
	door						
		1.000	6.500				6.500
	Total						**6.500**
						Total Quantity in metre	**6.500**
1.015	9.142.2						
	35 mm thick factory made Solid panel PVC Door shutter, made out of single piece extruded solid PVC (±0.2 mm) thick, having styles & rails (except lock rail) of size 95 mmx 35 mm x 5 mm, out of which 75 mm shall be flat and 20 mm shall be tapered (on both side), having one side thickness of 15 mm integrally extruded on the hinges side of the profile for better screw holding power, including reinforcing with MS tube of size 40 mm x 20 mm x 1 mm, joints of styles & rails to be mitered cut & joint with the help of PVC solvent cement, self driven self tapping screws & M.S. rectangular pipes bracket of size 190 mm x 100 mm of cross section size 35 mm x 17 mm s 1 mm at each corner. Single piece extruded 5 mm thick solid PVC Lock rail of size 115 mm x 35 mm x 35 mm, out of which 95 mm to be flat and 20 mm to be tapered at both ends, having 15 mm solid core in middle of rail section integrally extruded, fixing the styles & rails with the help of solvent and self driven self tapping screws of 125 mm x 11 mm, including providing 5 mm Single piece solid PVC extruded sheet inserted in the door as panel, all complete as per manufacturer's specification and direction of Engineer-in-charge.Decorative finish (wood grained finish)						
	door						
		1.000	1.000		2.100		2.100
	Total						**2.100**
						Total Quantity in sqm	**2.100**
1.016	9.147.5						

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(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing factory made uPVC white colour casement/casement cum fixed glazed windows comprising of uPVC multi-chambered frame, sash and mullion (where ever required) extruded profiles duly reinforced with 1.60 +/- 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), uPVC extruded glazing beads of appropriate dimension, EPDM gasket, stainless steel (SS 304 grade) friction hinges, zinc alloy (white powder coated) casement handles, G.I fasteners 100 x 8 mm size for fixing frame to finished wall, plastic packers, plastic caps and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, mullion (if required) shall be also fusion welded including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, all complete as per approved drawing & direction of Engineer-in-Charge. (Single / double glass panes and silicon sealant shall be paid separately) Note: For uPVC frame, sash and mullion extruded profiles minus 5% tolerance in dimension i.e. in depth & width of profile shall be acceptable.Casement window double panels with S.S. friction hinges (350 x 19 x 1.9 mm) made of (big series)frame 67 x 60 mm & sash / mullion 67 x 80 mm both having wall thickness of 2.3 ± 0.2 mm and single glazing bead/ double glazing bead of appropriate dimension. (Area of window above 1.50 sqm).						
	window						
		1.000	2.000		1.500		3.000
	Total						**3.000**
						Total Quantity in sqm	**3.000**
1.017	9.7.7.1						
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick: Float glass panes4 mm thick glass pane						
	window						
		4.000	0.400		1.400		2.240
	Total						**2.240**
						Total Quantity in sqm	**2.240**
1.018	9.100.2						
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm						
	door						
		2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.019	9.97.3						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm						
	door						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.020	50.9.15.2						
	Supplying and fixing 300 mm Aluminium aldrop						
	for door						
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.021	13.7.2						
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:4 (1 cement : 4 fine sand)						
	plastering						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	Total						**448.730**
	pump house						
	long wall	2*2	6.000		3.000		72.000
	cross wall	2*2	5.600		3.000		67.200
	door	-1*2	1.000		2.100		-4.200
	window	-1*2	2.000		1.500		-6.000
	Total						**129.000**
						Total Quantity in sqm	**577.730**
1.022	13.15						
	20 mm cement plaster 1:2 (1 cement : 2 stone dust)						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Inside water tank						
	Floor of slab (excluding haunch)	1.000					1.000
	Vertical sides	1.000					1.000
	Haunchings	1.000					1.000
	Total						**3.000**
						Total Quantity in sqm	**3.000**
1.023	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	ceiling						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**151.640**
1.024	10.25.2						
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works						
	For Ladder						
	Ladder for (Stage height 12.45 m)	4.000	1000.000			1.000000	4000.000
	Total						**4000.000**
						Total Quantity in kg	**4000.000**
1.025	13.43.1						
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	painting						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	pump house-long wall	2*2	6.000		3.000		72.000
	do-cross wall	2*2	5.600		3.000		67.200
	do-door	-1*2	1.000		2.100		-4.200
	do-window	-1*2	2.000		1.500		-6.000
	Total						**577.730**
	painting ceilings						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**729.370**
1.026	13.60.1						
	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade:Two or more coats on new work						
	painting						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	pump house-long wall	2*2	6.000		3.000		72.000
	do-cross wall	2*2	5.600		3.000		67.200
	do-door	-1*2	1.000		2.100		-4.200

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	do-window	-1*2	2.000		1.500		-6.000
	Total						**577.730**
	painting ceiling						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**729.370**
1.027	50.18.9.9.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2						
	pipe line						
		150.000					150.000
	Total						**150.000**
						Total Quantity in metre	**150.000**
1.028	50.18.8.8.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 75 mm pipe 6 Kgf/cm2						
	pipe line						
		20.000					20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
1.029	18.17.5						
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :65 mm nominal bore						
	for supply lines						
		5.000					5.000
	Total						**5.000**
						Total Quantity in each	**5.000**
1.030	50.18.9.8.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	supply line						
		1000.000					1000.000
	Total						**1000.000**
						Total Quantity in metre	**1000.000**
1.031	50.18.7.4.2						
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall						
	pipe line						
		1.000	750.000				750.000
	Total						**750.000**
						Total Quantity in metre	**750.000**
1.032	18.17.2						
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :32 mm nominal bore						
	for supply lines						
		10.000					10.000
	Total						**10.000**
						Total Quantity in each	**10.000**
1.033	18.32.1						
	Constructing masonry chamber 30x30x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for stop cock, with C.I. surface box 100x100x75 mm (inside) with hinged cover fixed in cement concrete slab 1:2:4 mix (1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S (non modular) bricks of class designation 7.5						
	for inspection chamber						
		3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.034	50.18.9.21.4						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend						
	bend						
		10.000					10.000
	Total						**10.000**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in no	**10.000**
1.035	50.18.9.21.9						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling						
	socket						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
1.036	18.59.2						
	Providing and fixing C.I double acting air valve of approved quality with bolts, nuts, rubber insertion etc. complete (The tail pieces, tapers etc. if required will be paid separately):80 mm dia						
	air valve						
		3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.037	50.18.9.6.2						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2						
	pipe line						
		100.000					100.000
	Total						**100.000**
						Total Quantity in metre	**100.000**
1.038	50.18.9.21						
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Elbow						
	elbow						
		10.000					10.000
	Total						**10.000**
						Total Quantity in no	**10.000**
1.039	50.18.9.21.5						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee						
	tee						
		10.000					10.000
	Total						**10.000**
						Total Quantity in no	**10.000**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.040	18.15.2						
	Providing and fixing brass bib cock of approved quality :20 mm nominal bore						
	bib cock						
		20.000					20.000
	Total						**20.000**
						Total Quantity in each	**20.000**
1.041	18.60.1						
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore						
	water meter						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
2	Pile liners and miscellaneous items for piling						
2.001	12.22						
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.						
	6 mm liner 47.1 kg/m2						
		9.000	3.14*.606	47.1/1000	5.000		4.033
	Total						**4.033**
						Total Quantity in MT	**4.033**
2.002	OD1321/2022-2023						
	Driving down vertically M.s Liner already fabricated to the required depth by power winch and accessories including all hire charge of machinery , labour charges etc complete						
	6mm thk liner for piles						
		9.000	5.000				45.000
	Total						**45.000**
						Total Quantity in metre	**45.000**
2.003	OD1325/2022-2023						
	Supply, Fitting and Placing in position reinforcement in cages using HCR bar Reinforcement including cost of materials, labour charges, conveyance and placing the cages in bore holes providing precast cover blocks etc, complete as per Drawing and Technical Specificationsand as directed by Engineer in charge excluding cost of welding charges. Unit = 1 MT Taking output = 1 MT a) Material						
	for pile						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	pile 80kg/m3	9.000	25.000	3.140	0.600	0.080000	33.912
	pile cap 120kg/m3	1.000	6.400	6.400	0.750	0.120000	3.686
	rounding	1.000	0.967				0.967
	Total						**38.565**
						Total Quantity in tonne	**38.565**
2.004	12.23.3						
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm						
	Piles						
		9.000	25.000				225.000
	Total						**225.000**
						Total Quantity in metre	**225.000**
3	Construction of Sump						
3.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	sump						
		1.000	6.600	6.600	1.500		65.340
	Total						**65.340**
						Total Quantity in cum	**65.340**
3.002	60.7.4						
	DR PACKING FOR APRONS - Rough stone dry packing for apron with good quality blasted rubble including packing to compactness to lines levels, cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site						
	sump						
		1.000	6.600	6.600	0.450		19.602
	Total						**19.602**
						Total Quantity in cum	**19.602**
3.003	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	for sump						
	foundation	1.000	6.600	6.600	0.150		6.534

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**6.534**
						Total Quantity in cum	**6.534**
3.004	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	for sump						
	base slab	4.000	6.600		0.150		3.960
	Total						**3.960**
						Total Quantity in sqm	**3.960**
3.005	5.9.2						
	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.						
	for sump						
	side wall inner	4.000	5.600		2.000		44.800
	side wall inner	4.000	2.700		2.000		21.600
	side wall outer	8.000	2.700		2.000		43.200
	side wall edges	8.000	1.000		2.000		16.000
	Total						**125.600**
						Total Quantity in sqm	**125.600**
3.006	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	for sump						
	covering slab	2.000	6.300	2.700			34.020
	Total						**34.020**
						Total Quantity in sqm	**34.020**
3.007	5.1.2						
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size						
	for sump						
	bed slab	1.000	6.300	6.300	0.200		7.938
	rounding	1.000	0.062				0.062
	Total						**8.000**
						Total Quantity in cum	**8.000**
3.008	5.2.2						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)						
	for sump						
	Side walls	8.000	2.700	0.200	2.000		8.640
	do-projections	8.000	0.350	0.350	2.000		1.960
	Side wall inner	1.000	5.600	0.200	2.000		2.240
	rounding	1.000	0.160				0.160
	Total						**13.000**
						Total Quantity in cum	**13.000**
3.009	5.3						
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).						
	for sump						
	covering slab	1.000	6.300	6.300	0.150		5.954
	rounding	1.000	0.046				0.046
	Total						**6.000**
						Total Quantity in cum	**6.000**
3.010	5.22.1						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelMild steel and Medium Tensile steel bars						
	for sump						
	For bed slab-80kg/m3	1.000	8.000			80.000000	640.000
	Total						**640.000**
						Total Quantity in kg	**640.000**
3.011	5.22A.1						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Mild steel and Medium Tensile steel bars						
	for sump						
	For side wall-120kg/m3	1.000	13.000			120.000000	1560.000
	For covering slab-100kg/m3	1.000	6.000			100.000000	600.000

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**2160.000**
						Total Quantity in kilogram	**2160.000**
3.012	50.13.1						
	9 mm cement plastering of mix : 1:3 (1 cement : 3 fine sand) including all cost of materials, labour charges etc complete						
	for sump						
	side walls outside	8.000	2.700		2.000		43.200
	do-projections	8.000	1.000		2.000		16.000
	Total						**59.200**
						Total Quantity in sqm	**59.200**
3.013	13.9.1						
	Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster						
	for sump						
	side walls inside	4.000	5.600		2.000		44.800
	side walls inside	4.000	2.700		2.000		21.600
	Total						**66.400**
						Total Quantity in sqm	**66.400**
3.014	50.18.9.19.2						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 m dia 4 Kgf/cm2 - External work - Exposed on wall						
	for sump						
		1.000	10.000				10.000
	Total						**10.000**
						Total Quantity in metre	**10.000**
3.015	50.18.9.8.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2						
	for sump						
		1.000	50.000				50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
3.016	50.18.9.18.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for sump						
		1.000	50.000				50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
3.017	50.18.7.6.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing . This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 6 Kgf/cm2 - Internal work- Exposed on wall						
	for sump						
		1.000	20.000				20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
3.018	50.18.9.6.2						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2						
	for sump						
		1.000	20.000				20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
3.019	50.18.9.21.4						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend						
	for sump						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
3.020	50.18.9.21.5						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee						
	for sump						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
3.021	50.18.9.21.8						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75 mm dia End cap						
	for sump						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
3.022	50.18.9.21.9						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling						
	for sump						
		2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
3.023	18.37.1						
	Constructing masonry chamber 60x45x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for water meter complete with C.I double flap surface box 400x200x200 mm (inside) with locking arrangement and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 grades stone aggregate 20 nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S. (non modular) bricks of class designation 7.5						
	Inspection Chamber						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
3.024	18.60.1						
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore						
	water meter						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**

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ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Water Supply Arrangements in the Harbour-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Construction of OH RCC Water Tank and Pump House**			
1.001	2.31			
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared			
	Net Total	400.000sqm	@14.48/sqm	5792.00
1.002	OD1292/2022-2023			
	Chipping and removing top of RCC piles to lines and levels carefully without damaging remaining portion of pile and removing debris upto a distance of 150 m including all labour charges , hire of equipments etc.complete as per directions of departmental officers at site Unit- cum Taking output - 1.25 cum			
	Net Total	2.543cum	@3537.94/cum	8996.98
1.003	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	65.340cum	@210.02/cum	13722.71
1.004	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	6.534cum	@6687.21/cum	43694.23
1.005	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	33.074cum	@9237.20/cum	305511.15
1.006	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content			

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Sl No	Specification	Quantity	Rate	Amount
	as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	88.000cum	@10858.36/cum	955535.68
1.007	5.34.1			
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	121.074cum	@80.55/cum	9752.51
1.008	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	38.280sqm	@329.03/sqm	12595.27
1.009	OD5503/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - HCR Fe-500D or more			
	Net Total	13858.800kg	@96.62/kg	1339037.26
1.010	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	179.280sqm	@847.44/sqm	151929.04
1.011	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	200.160sqm	@800.47/sqm	160222.08
1.012	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	133.770sqm	@637.63/sqm	85295.77
1.013	50.6.7.2			
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.			
	Net Total	12.900cum	@7872.96/cum	101561.18
1.014	9.143			
	Providing and fixing factory made uPVC door frame, made of uPVC extruded			

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Sl No	Specification	Quantity	Rate	Amount
	section, of size 65 mm x 55 mm with wall thickness 2.0 mm (? 0.2mm), corners of the door frame to be mitred cut and jointed with plastic brackets and stainless steel screws, reinforcing hinge side vertical of the frames with PVC profile of Size 28 mm x 30 mm having wall thickness 2 mm (? 0.2 mm), including providing & fixing 3 nos of 125 mm long stainless steel hinges to the frame, fixing the frame with jamb with required number & size of anchor dash fastners, all complete as per manufacturer's specification and direction of Engineer-in-charge.			
	Net Total	6.500metre	@610.23/metre	3966.50
1.015	9.142.2			
	35 mm thick factory made Solid panel PVC Door shutter, made out of single piece extruded solid PVC (±0.2 mm) thick, having styles & rails (except lock rail) of size 95 mmx 35 mm x 5 mm, out of which 75 mm shall be flat and 20 mm shall be tapered (on both side), having one side thickness of 15 mm integrally extruded on the hinges side of the profile for better screw holding power, including reinforcing with MS tube of size 40 mm x 20 mm x 1 mm, joints of styles & rails to be mitered cut & joint with the help of PVC solvent cement, self driven self tapping screws & M.S. rectangular pipes bracket of size 190 mm x 100 mm of cross section size 35 mm x 17 mm s 1 mm at each corner. Single piece extruded 5 mm thick solid PVC Lock rail of size 115 mm x 35 mm x 35 mm, out of which 95 mm to be flat and 20 mm to be tapered at both ends, having 15 mm solid core in middle of rail section integrally extruded, fixing the styles & rails with the help of solvent and self driven self tapping screws of 125 mm x 11 mm, including providing 5 mm Single piece solid PVC extruded sheet inserted in the door as panel, all complete as per manufacturer's specification and direction of Engineer-in-charge.Decorative finish (wood grained finish)			
	Net Total	2.100sqm	@4438.67/sqm	9321.21
1.016	9.147.5			
	Providing and fixing factory made uPVC white colour casement/casement cum fixed glazed windows comprising of uPVC multi-chambered frame, sash and mullion (where ever required) extruded profiles duly reinforced with 1.60 +/- 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), uPVC extruded glazing beads of appropriate dimension, EPDM gasket, stainless steel (SS 304 grade) friction hinges, zinc alloy (white powder coated) casement handles, G.I fasteners 100 x 8 mm size for fixing frame to finished wall, plastic packers, plastic caps and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, mullion (if required) shall be also fusion welded including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, all complete as per approved drawing & direction of Engineer-in-Charge. (Single / double glass panes and silicon sealant shall be paid separately) Note: For uPVC frame, sash and mullion extruded profiles minus 5% tolerance in dimension i.e. in depth & width of profile shall be acceptable.Casement window double panels with S.S. friction hinges (350 x 19 x 1.9 mm) made of (big series)frame 67 x 60 mm & sash / mullion 67 x 80 mm both having wall thickness of 2.3 ± 0.2 mm and single glazing bead/ double glazing bead of appropriate dimension. (Area of window above 1.50 sqm).			
	Net Total	3.000sqm	@11164.86/sqm	33494.58

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Sl No	Specification	Quantity	Rate	Amount
1.017	9.7.7.1			
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick: Float glass panes4 mm thick glass pane			
	Net Total	2.240sqm	@2070.48/sqm	4637.88
1.018	9.100.2			
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm			
	Net Total	2.000no	@61.02/no	122.04
1.019	9.97.3			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm			
	Net Total	4.000no	@103.95/no	415.80
1.020	50.9.15.2			
	Supplying and fixing 300 mm Aluminium aldrop			
	Net Total	1.000no	@188.93/no	188.93
1.021	13.7.2			
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	577.730sqm	@379.14/sqm	219040.55
1.022	13.15			
	20 mm cement plaster 1:2 (1 cement : 2 stone dust)			
	Net Total	3.000sqm	@476.55/sqm	1429.65
1.023	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	151.640sqm	@262.57/sqm	39816.11
1.024	10.25.2			
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works			
	Net Total	4000.000kg	@151.29/kg	605160.00
1.025	13.43.1			
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer			

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Sl No	Specification	Quantity	Rate	Amount
	Net Total	729.370sqm	@69.33/sqm	50567.22
1.026	13.60.1			
	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade:Two or more coats on new work			
	Net Total	729.370sqm	@148.59/sqm	108377.09
1.027	50.18.9.9.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2			
	Net Total	150.000metre	@521.14/metre	78171.00
1.028	50.18.8.8.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 75 mm pipe 6 Kgf/cm2			
	Net Total	20.000metre	@614.17/metre	12283.40
1.029	18.17.5			
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :65 mm nominal bore			
	Net Total	5.000each	@1718.82/each	8594.10
1.030	50.18.9.8.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2			
	Net Total	1000.000metre	@356.56/metre	356560.00
1.031	50.18.7.4.2			
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall			
	Net Total	750.000metre	@295.71/metre	221782.50
1.032	18.17.2			
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :32 mm nominal bore			
	Net Total	10.000each	@671.37/each	6713.70
1.033	18.32.1			
	Constructing masonry chamber 30x30x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for stop cock, with C.I. surface box 100x100x75 mm (inside) with hinged cover fixed in cement concrete slab 1:2:4 mix (1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm			

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Sl No	Specification	Quantity	Rate	Amount
	nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S (non modular) bricks of class designation 7.5			
	Net Total	3.000each	@1827.73/each	5483.19
1.034	50.18.9.21.4			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend			
	Net Total	10.000no	@87.89/no	878.90
1.035	50.18.9.21.9			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling			
	Net Total	5.000no	@72.21/no	361.05
1.036	18.59.2			
	Providing and fixing C.I double acting air valve of approved quality with bolts, nuts, rubber insertion etc. complete (The tail pieces, tapers etc. if required will be paid separately):80 mm dia			
	Net Total	3.000no	@7208.30/no	21624.90
1.037	50.18.9.6.2			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2			
	Net Total	100.000metre	@240.68/metre	24068.00
1.038	50.18.9.21			
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Elbow			
	Net Total	10.000no	@94.28/no	942.80
1.039	50.18.9.21.5			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee			
	Net Total	10.000no	@94.65/no	946.50
1.040	18.15.2			
	Providing and fixing brass bib cock of approved quality :20 mm nominal bore			
	Net Total	20.000each	@377.04/each	7540.80
1.041	18.60.1			
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore			
	Net Total	1.000each	@4130.60/each	4130.60
			Heading Total(Rs)	5020264.86

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Sl No	Specification	Quantity	Rate	Amount
2	**Pile liners and miscellaneous items for piling**			
2.001	12.22			
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.			
	Net Total	4.033MT	@125636.20/MT	506690.79
2.002	OD1321/2022-2023			
	Driving down vertically M.s Liner already fabricated to the required depth by power winch and accessories including all hire charge of machinery , labour charges etc complete			
	Net Total	45.000metre	@568.30/metre	25573.50
2.003	OD1325/2022-2023			
	Supply, Fitting and Placing in position reinforcement in cages using HCR bar Reinforcement including cost of materials, labour charges, conveyance and placing the cages in bore holes providing precast cover blocks etc, complete as per Drawing and Technical Specificationsand as directed by Engineer in charge excluding cost of welding charges. Unit = 1 MT Taking output = 1 MT a) Material			
	Net Total	38.565tonne	@98321.63/tonne	3791773.66
2.004	12.23.3			
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm			
	Net Total	225.000metre	@7210.41/metre	1622342.25
			Heading Total(Rs)	5946380.20
3	**Construction of Sump**			
3.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	65.340cum	@210.02/cum	13722.71
3.002	60.7.4			
	DR PACKING FOR APRONS - Rough stone dry packing for apron with good quality blasted rubble including packing to compactness to lines levels, cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site			
	Net Total	19.602cum	@3557.50/cum	69734.12
3.003	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4			

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(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	6.534cum	@6687.21/cum	43694.23
3.004	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	3.960sqm	@329.03/sqm	1302.96
3.005	5.9.2			
	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.			
	Net Total	125.600sqm	@703.77/sqm	88393.51
3.006	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	34.020sqm	@800.47/sqm	27231.99
3.007	5.1.2			
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size			
	Net Total	8.000cum	@8914.94/cum	71319.52
3.008	5.2.2			
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)			
	Net Total	13.000cum	@10748.82/cum	139734.66
3.009	5.3			
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).			
	Net Total	6.000cum	@11277.61/cum	67665.66
3.010	5.22.1			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelMild steel and Medium Tensile steel bars			
	Net Total	640.000kg	@94.84/kg	60697.60
3.011	5.22A.1			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Mild steel and Medium			

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Sl No	Specification	Quantity	Rate	Amount
	Tensile steel bars			
	Net Total	2160.000kilogram	@94.84/kilogram	204854.40
3.012	50.13.1			
	9 mm cement plastering of mix : 1:3 (1 cement : 3 fine sand) including all cost of materials, labour charges etc complete			
	Net Total	59.200sqm	@285.84/sqm	16921.73
3.013	13.9.1			
	Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster			
	Net Total	66.400sqm	@404.42/sqm	26853.49
3.014	50.18.9.19.2			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 m dia 4 Kgf/cm2 - External work - Exposed on wall			
	Net Total	10.000metre	@329.39/metre	3293.90
3.015	50.18.9.8.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2			
	Net Total	50.000metre	@356.56/metre	17828.00
3.016	50.18.9.18.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall			
	Net Total	50.000metre	@279.39/metre	13969.50
3.017	50.18.7.6.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing . This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 6 Kgf/cm2 - Internal work- Exposed on wall			
	Net Total	20.000metre	@369.84/metre	7396.80
3.018	50.18.9.6.2			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2			
	Net Total	20.000metre	@240.68/metre	4813.60
3.019	50.18.9.21.4			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend			

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Sl No	Specification	Quantity	Rate	Amount
	Net Total	5.000no	@87.89/no	439.45
3.020	50.18.9.21.5			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee			
	Net Total	5.000no	@94.65/no	473.25
3.021	50.18.9.21.8			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75 mm dia End cap			
	Net Total	1.000no	@64.08/no	64.08
3.022	50.18.9.21.9			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling			
	Net Total	2.000no	@72.21/no	144.42
3.023	18.37.1			
	Constructing masonry chamber 60x45x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for water meter complete with C.I double flap surface box 400x200x200 mm (inside) with locking arrangement and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 grades stone aggregate 20 nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S. (non modular) bricks of class designation 7.5			
	Net Total	1.000each	@9587.28/each	9587.28
3.024	18.60.1			
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore			
	Net Total	1.000each	@4130.60/each	4130.60
			Heading Total(Rs)	894267.46
			Total Estimation PAC	11860912.52
Sl No	**Description**		**Percentage/LS**	**Amount**
4	**Lumsum Heading**			
4.001	LS provision for part TS			
		0.00	0.00%	2000000.00
4.002	Water connection charges (KWA)			
		0.00	0.00%	1000000.00
4.003	LS Amount for Electrification			
		0.00	0.00%	1900000.00
			Total Lumsum Amount	4900000.00

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Sl No	Specification	Quantity	Rate	Amount
5	**Extra Charges**			
4.001	Provision for GST			
		11860912.52	18.00%	2134964.25
			Grand Total	18895876.77
			Round off	4123.23
			Rounded Total(Rs)	18900000.00
	Rupees One Crore Eighty Nine Lakh			

ePRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Water Supply Arrangements in the Harbour-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Construction of OH RCC Water Tank and Pump House						
1.001	2.31						
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared						
	site clearance						
		1.000	20.000	20.000			400.000
	Total						**400.000**
						Total Quantity in sqm	**400.000**
1.002	OD1292/2022-2023						
	Chipping and removing top of RCC piles to lines and levels carefully without damaging remaining portion of pile and removing debris upto a distance of 150 m including all labour charges , hire of equipments etc.complete as per directions of departmental officers at site Unit- cum Taking output - 1.25 cum						
	for pile						
		9.000	3.140/4	.6*.6	1.000	1.000000	2.543
	Total						**2.543**
						Total Quantity in cum	**2.543**
1.003	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	for pile cap						
		1.000	6.600	6.600	1.500		65.340
	Total						**65.340**
						Total Quantity in cum	**65.340**
1.004	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	for pile pcc						
		1.000	6.600	6.600	0.150		6.534
	Total						**6.534**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**6.534**
1.005	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	column upto GL and footing						
	column upto GL	9.000	0.600	0.600	0.700		2.268
	Raft	1.000	6.400	6.400	0.750		30.720
	rounding	1.000	0.086				0.086
	Total						**33.074**
						Total Quantity in cum	**33.074**
1.006	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	columns and walls						
	column from GL to top	9.000	0.400	0.400	12.450		17.928
	Wall of water tank	2.000	6.000	0.250	3.000		9.000
		2.000	5.600	0.250	3.000		8.400
	rounding	1.000	2.672				2.672
	Total						**38.000**
	Beams and slab						
	tie beams	12*3	2.400	0.300	0.300		7.776
	haunch	24*3	0.300	0.300	0.300		1.944
	bottom slab for tank	1.000	7.600	7.600	0.250		14.440
	bottom beam for slab	3.000	6.000	0.300	0.300		1.620
		3.000	5.100	0.300	0.300		1.377

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	top slab cover	1.000	6.000	6.000	0.120		4.320
	slab on GF	1.000	7.600	7.600	0.150		8.664
	slab projections	2*4	7.600	0.800	0.150		7.296
	lintel GF	1.000	6.000	0.200	0.200		0.240
	sunshade GF	1.000	6.000	0.600	0.100		0.360
	rounding	1.000	1.963				1.963
	Total						**50.000**
						Total Quantity in cum	**88.000**
1.007	5.34.1						
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	column upto GL and footing						
	column upto GL	9.000	0.600	0.600	0.700		2.268
	Raft	1.000	6.400	6.400	0.750		30.720
	rounding	1.000	0.086				0.086
	Total						**33.074**
	columns and walls						
	column from GL to top	9.000	0.400	0.400	12.450		17.928
	Wall of water tank	2.000	6.000	0.250	3.000		9.000
		2.000	5.600	0.250	3.000		8.400
	rounding	1.000	2.672				2.672
	Total						**38.000**
	Beams and slab						
	tie beams	12*3	2.400	0.300	0.300		7.776
	haunch	24*3	0.300	0.300	0.300		1.944
	bottom slab for tank	1.000	7.600	7.600	0.250		14.440
	bottom beam for slab	3.000	6.000	0.300	0.300		1.620
		3.000	5.100	0.300	0.300		1.377
	top slab cover	1.000	6.000	6.000	0.120		4.320
	slab on GF	1.000	7.600	7.600	0.150		8.664
	slab projections	2*4	7.600	0.800	0.150		7.296
	lintel GF	1.000	6.000	0.200	0.200		0.240
	sunshade GF	1.000	6.000	0.600	0.100		0.360

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	1.963				1.963
	Total						**50.000**
						Total Quantity in cum	**121.074**
1.008	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	for pile cap						
	for pcc	4.000	6.600		0.150		3.960
	for pile cap	4.000	6.400		0.750		19.200
	column upto GL	9.000	2.400		0.700		15.120
	Total						**38.280**
						Total Quantity in sqm	**38.280**
1.009	OD5503/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - HCR Fe-500D or more						
	Reinforcement						
		1.000	38.000			120.000000	4560.000
		1.000	50.000			120.000000	6000.000
	Total						**10560.000**
	column						
	column upto GL	9.000	0.600	0.600	0.700	100.000000	226.800
	Raft	1.000	6.400	6.400	0.750	100.000000	3072.000
	Total						**3298.800**
						Total Quantity in kg	**13858.800**
1.010	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	column						
		9.000	1.600		12.450		179.280
	Total						**179.280**
						Total Quantity in sqm	**179.280**
1.011	5.9.3						

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	slabs						
	bottom slab for tank	1.000	7.600	7.600			57.760
	top slab cover	1.000	6.000	6.000			36.000
	slab on GF	1.000	7.600	7.600			57.760
	slab projections	2*4	7.600	0.800			48.640
	Total						**200.160**
						Total Quantity in sqm	**200.160**
1.012	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	beams						
	tie beams	12*3	2.400	0.900			77.760
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	lintel GF	1.000	6.000	0.400			2.400
	Sunshade GF	1.000	6.000	0.700			4.200
	Total						**133.770**
						Total Quantity in sqm	**133.770**
1.013	50.6.7.2						
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.						
	Pump house at GF						
	long wall	2.000	6.000	0.200	3.000		7.200
	cross wall	2.000	5.600	0.200	3.000		6.720
	Total						**13.920**
	deduction						
	door	-1.000	1.000	0.200	2.100		-0.420
	window	-1.000	2.000	0.200	1.500		-0.600
	Total						**-1.020**
						Total Quantity in cum	**12.900**
1.014	9.143						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing factory made uPVC door frame, made of uPVC extruded section, of size 65 mm x 55 mm with wall thickness 2.0 mm (? 0.2mm), corners of the door frame to be mitred cut and jointed with plastic brackets and stainless steel screws, reinforcing hinge side vertical of the frames with PVC profile of Size 28 mm x 30 mm having wall thickness 2 mm (? 0.2 mm), including providing & fixing 3 nos of 125 mm long stainless steel hinges to the frame, fixing the frame with jamb with required number & size of anchor dash fastners, all complete as per manufacturer's specification and direction of Engineer-in-charge.						
	door						
		1.000	6.500				6.500
	Total						**6.500**
						Total Quantity in metre	**6.500**
1.015	9.142.2						
	35 mm thick factory made Solid panel PVC Door shutter, made out of single piece extruded solid PVC (±0.2 mm) thick, having styles & rails (except lock rail) of size 95 mmx 35 mm x 5 mm, out of which 75 mm shall be flat and 20 mm shall be tapered (on both side), having one side thickness of 15 mm integrally extruded on the hinges side of the profile for better screw holding power, including reinforcing with MS tube of size 40 mm x 20 mm x 1 mm, joints of styles & rails to be mitered cut & joint with the help of PVC solvent cement, self driven self tapping screws & M.S. rectangular pipes bracket of size 190 mm x 100 mm of cross section size 35 mm x 17 mm s 1 mm at each corner. Single piece extruded 5 mm thick solid PVC Lock rail of size 115 mm x 35 mm x 35 mm, out of which 95 mm to be flat and 20 mm to be tapered at both ends, having 15 mm solid core in middle of rail section integrally extruded, fixing the styles & rails with the help of solvent and self driven self tapping screws of 125 mm x 11 mm, including providing 5 mm Single piece solid PVC extruded sheet inserted in the door as panel, all complete as per manufacturer's specification and direction of Engineer-in-charge.Decorative finish (wood grained finish)						
	door						
		1.000	1.000		2.100		2.100
	Total						**2.100**
						Total Quantity in sqm	**2.100**
1.016	9.147.5						

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing factory made uPVC white colour casement/casement cum fixed glazed windows comprising of uPVC multi-chambered frame, sash and mullion (where ever required) extruded profiles duly reinforced with 1.60 +/- 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), uPVC extruded glazing beads of appropriate dimension, EPDM gasket, stainless steel (SS 304 grade) friction hinges, zinc alloy (white powder coated) casement handles, G.I fasteners 100 x 8 mm size for fixing frame to finished wall, plastic packers, plastic caps and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, mullion (if required) shall be also fusion welded including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, all complete as per approved drawing & direction of Engineer-in-Charge. (Single / double glass panes and silicon sealant shall be paid separately) Note: For uPVC frame, sash and mullion extruded profiles minus 5% tolerance in dimension i.e. in depth & width of profile shall be acceptable.Casement window double panels with S.S. friction hinges (350 x 19 x 1.9 mm) made of (big series)frame 67 x 60 mm & sash / mullion 67 x 80 mm both having wall thickness of 2.3 ± 0.2 mm and single glazing bead/ double glazing bead of appropriate dimension. (Area of window above 1.50 sqm).						
	window						
		1.000	2.000		1.500		3.000
	Total						**3.000**
						Total Quantity in sqm	**3.000**
1.017	9.7.7.1						
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick: Float glass panes4 mm thick glass pane						
	window						
		4.000	0.400		1.400		2.240
	Total						**2.240**
						Total Quantity in sqm	**2.240**
1.018	9.100.2						
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm						
	door						
		2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.019	9.97.3						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm						
	door						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.020	50.9.15.2						
	Supplying and fixing 300 mm Aluminium aldrop						
	for door						
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.021	13.7.2						
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:4 (1 cement : 4 fine sand)						
	plastering						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	Total						**448.730**
	pump house						
	long wall	2*2	6.000		3.000		72.000
	cross wall	2*2	5.600		3.000		67.200
	door	-1*2	1.000		2.100		-4.200
	window	-1*2	2.000		1.500		-6.000
	Total						**129.000**
						Total Quantity in sqm	**577.730**
1.022	13.15						
	20 mm cement plaster 1:2 (1 cement : 2 stone dust)						

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Inside water tank						
	Floor of slab (excluding haunch)	1.000					1.000
	Vertical sides	1.000					1.000
	Haunchings	1.000					1.000
	Total						**3.000**
						Total Quantity in sqm	**3.000**
1.023	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	ceiling						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**151.640**
1.024	10.25.2						
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works						
	For Ladder						
	Ladder for (Stage height 12.45 m)	4.000	1000.000			1.000000	4000.000
	Total						**4000.000**
						Total Quantity in kg	**4000.000**
1.025	13.43.1						
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	painting						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	pump house-long wall	2*2	6.000		3.000		72.000
	do-cross wall	2*2	5.600		3.000		67.200
	do-door	-1*2	1.000		2.100		-4.200
	do-window	-1*2	2.000		1.500		-6.000
	Total						**577.730**
	painting ceilings						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**729.370**
1.026	13.60.1						
	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade:Two or more coats on new work						
	painting						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	pump house-long wall	2*2	6.000		3.000		72.000
	do-cross wall	2*2	5.600		3.000		67.200
	do-door	-1*2	1.000		2.100		-4.200

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EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	do-window	-1*2	2.000		1.500		-6.000
	Total						**577.730**
	painting ceiling						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**729.370**
1.027	50.18.9.9.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2						
	pipe line						
		150.000					150.000
	Total						**150.000**
						Total Quantity in metre	**150.000**
1.028	50.18.8.8.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 75 mm pipe 6 Kgf/cm2						
	pipe line						
		20.000					20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
1.029	18.17.5						
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :65 mm nominal bore						
	for supply lines						
		5.000					5.000
	Total						**5.000**
						Total Quantity in each	**5.000**
1.030	50.18.9.8.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2						

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	supply line						
		1000.000					1000.000
	Total						**1000.000**
						Total Quantity in metre	**1000.000**
1.031	50.18.7.4.2						
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall						
	pipe line						
		1.000	750.000				750.000
	Total						**750.000**
						Total Quantity in metre	**750.000**
1.032	18.17.2						
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :32 mm nominal bore						
	for supply lines						
		10.000					10.000
	Total						**10.000**
						Total Quantity in each	**10.000**
1.033	18.32.1						
	Constructing masonry chamber 30x30x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for stop cock, with C.I. surface box 100x100x75 mm (inside) with hinged cover fixed in cement concrete slab 1:2:4 mix (1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S (non modular) bricks of class designation 7.5						
	for inspection chamber						
		3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.034	50.18.9.21.4						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend						
	bend						
		10.000					10.000
	Total						**10.000**

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in no	**10.000**
1.035	50.18.9.21.9						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling						
	socket						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
1.036	18.59.2						
	Providing and fixing C.I double acting air valve of approved quality with bolts, nuts, rubber insertion etc. complete (The tail pieces, tapers etc. if required will be paid separately):80 mm dia						
	air valve						
		3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.037	50.18.9.6.2						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2						
	pipe line						
		100.000					100.000
	Total						**100.000**
						Total Quantity in metre	**100.000**
1.038	50.18.9.21						
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Elbow						
	elbow						
		10.000					10.000
	Total						**10.000**
						Total Quantity in no	**10.000**
1.039	50.18.9.21.5						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee						
	tee						
		10.000					10.000
	Total						**10.000**
						Total Quantity in no	**10.000**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.040	18.15.2						
	Providing and fixing brass bib cock of approved quality :20 mm nominal bore						
	bib cock						
		20.000					20.000
	Total						**20.000**
						Total Quantity in each	**20.000**
1.041	18.60.1						
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore						
	water meter						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
2	Pile liners and miscellaneous items for piling						
2.001	12.22						
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.						
	6 mm liner 47.1 kg/m2						
		9.000	3.14*.606	47.1/1000	5.000		4.033
	Total						**4.033**
						Total Quantity in MT	**4.033**
2.002	OD1321/2022-2023						
	Driving down vertically M.s Liner already fabricated to the required depth by power winch and accessories including all hire charge of machinery , labour charges etc complete						
	6mm thk liner for piles						
		9.000	5.000				45.000
	Total						**45.000**
						Total Quantity in metre	**45.000**
2.003	OD1325/2022-2023						
	Supply, Fitting and Placing in position reinforcement in cages using HCR bar Reinforcement including cost of materials, labour charges, conveyance and placing the cages in bore holes providing precast cover blocks etc, complete as per Drawing and Technical Specificationsand as directed by Engineer in charge excluding cost of welding charges. Unit = 1 MT Taking output = 1 MT a) Material						
	for pile						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	pile 80kg/m3	9.000	25.000	3.140	0.600	0.080000	33.912
	pile cap 120kg/m3	1.000	6.400	6.400	0.750	0.120000	3.686
	rounding	1.000	0.967				0.967
	Total						**38.565**
						Total Quantity in tonne	**38.565**
2.004	12.23.3						
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm						
	Piles						
		9.000	25.000				225.000
	Total						**225.000**
						Total Quantity in metre	**225.000**
3	Construction of Sump						
3.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	sump						
		1.000	6.600	6.600	1.500		65.340
	Total						**65.340**
						Total Quantity in cum	**65.340**
3.002	60.7.4						
	DR PACKING FOR APRONS - Rough stone dry packing for apron with good quality blasted rubble including packing to compactness to lines levels, cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site						
	sump						
		1.000	6.600	6.600	0.450		19.602
	Total						**19.602**
						Total Quantity in cum	**19.602**
3.003	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	for sump						
	foundation	1.000	6.600	6.600	0.150		6.534

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**6.534**
						Total Quantity in cum	**6.534**
3.004	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	for sump						
	base slab	4.000	6.600		0.150		3.960
	Total						**3.960**
						Total Quantity in sqm	**3.960**
3.005	5.9.2						
	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.						
	for sump						
	side wall inner	4.000	5.600		2.000		44.800
	side wall inner	4.000	2.700		2.000		21.600
	side wall outer	8.000	2.700		2.000		43.200
	side wall edges	8.000	1.000		2.000		16.000
	Total						**125.600**
						Total Quantity in sqm	**125.600**
3.006	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	for sump						
	covering slab	2.000	6.300	2.700			34.020
	Total						**34.020**
						Total Quantity in sqm	**34.020**
3.007	5.1.2						
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size						
	for sump						
	bed slab	1.000	6.300	6.300	0.200		7.938
	rounding	1.000	0.062				0.062
	Total						**8.000**
						Total Quantity in cum	**8.000**
3.008	5.2.2						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)						
	for sump						
	Side walls	8.000	2.700	0.200	2.000		8.640
	do-projections	8.000	0.350	0.350	2.000		1.960
	Side wall inner	1.000	5.600	0.200	2.000		2.240
	rounding	1.000	0.160				0.160
	Total						**13.000**
						Total Quantity in cum	**13.000**
3.009	5.3						
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).						
	for sump						
	covering slab	1.000	6.300	6.300	0.150		5.954
	rounding	1.000	0.046				0.046
	Total						**6.000**
						Total Quantity in cum	**6.000**
3.010	5.22.1						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelMild steel and Medium Tensile steel bars						
	for sump						
	For bed slab-80kg/m3	1.000	8.000			80.000000	640.000
	Total						**640.000**
						Total Quantity in kg	**640.000**
3.011	5.22A.1						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Mild steel and Medium Tensile steel bars						
	for sump						
	For side wall-120kg/m3	1.000	13.000			120.000000	1560.000
	For covering slab-100kg/m3	1.000	6.000			100.000000	600.000

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**2160.000**
						Total Quantity in kilogram	**2160.000**
3.012	50.13.1						
	9 mm cement plastering of mix : 1:3 (1 cement : 3 fine sand) including all cost of materials, labour charges etc complete						
	for sump						
	side walls outside	8.000	2.700		2.000		43.200
	do-projections	8.000	1.000		2.000		16.000
	Total						**59.200**
						Total Quantity in sqm	**59.200**
3.013	13.9.1						
	Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster						
	for sump						
	side walls inside	4.000	5.600		2.000		44.800
	side walls inside	4.000	2.700		2.000		21.600
	Total						**66.400**
						Total Quantity in sqm	**66.400**
3.014	50.18.9.19.2						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 m dia 4 Kgf/cm2 - External work - Exposed on wall						
	for sump						
		1.000	10.000				10.000
	Total						**10.000**
						Total Quantity in metre	**10.000**
3.015	50.18.9.8.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2						
	for sump						
		1.000	50.000				50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
3.016	50.18.9.18.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for sump						
		1.000	50.000				50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
3.017	50.18.7.6.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing . This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 6 Kgf/cm2 - Internal work- Exposed on wall						
	for sump						
		1.000	20.000				20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
3.018	50.18.9.6.2						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2						
	for sump						
		1.000	20.000				20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
3.019	50.18.9.21.4						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend						
	for sump						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
3.020	50.18.9.21.5						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee						
	for sump						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
3.021	50.18.9.21.8						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75 mm dia End cap						
	for sump						

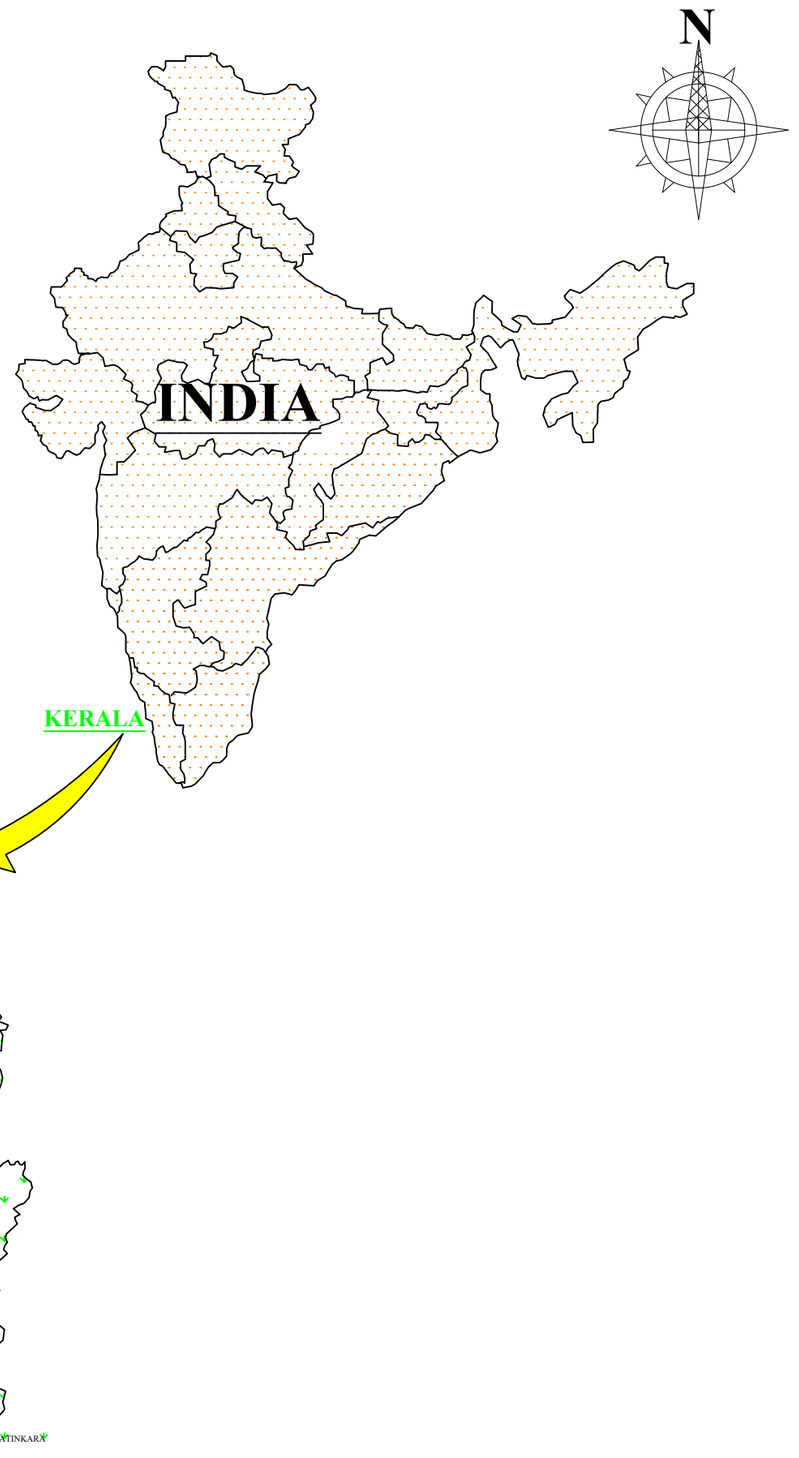
EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
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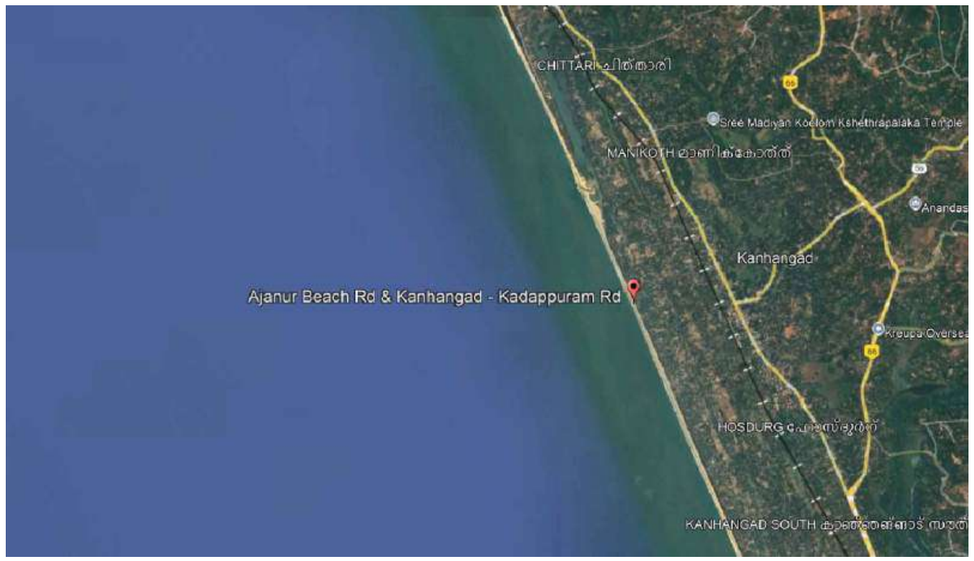
Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
3.022	50.18.9.21.9						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling						
	for sump						
		2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
3.023	18.37.1						
	Constructing masonry chamber 60x45x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for water meter complete with C.I double flap surface box 400x200x200 mm (inside) with locking arrangement and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 grades stone aggregate 20 nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S. (non modular) bricks of class designation 7.5						
	Inspection Chamber						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
3.024	18.60.1						
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore						
	water meter						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**

DRAWINGS

File No. HECE/207/2022-DR8 (Computer No. 19397)

Generated from eOffice by Gouri L, AE(C5)HED, AE(C5) HED, HARBOUR ENGINEERING DEPARTMENT on 18/06/2026 06:27 PM

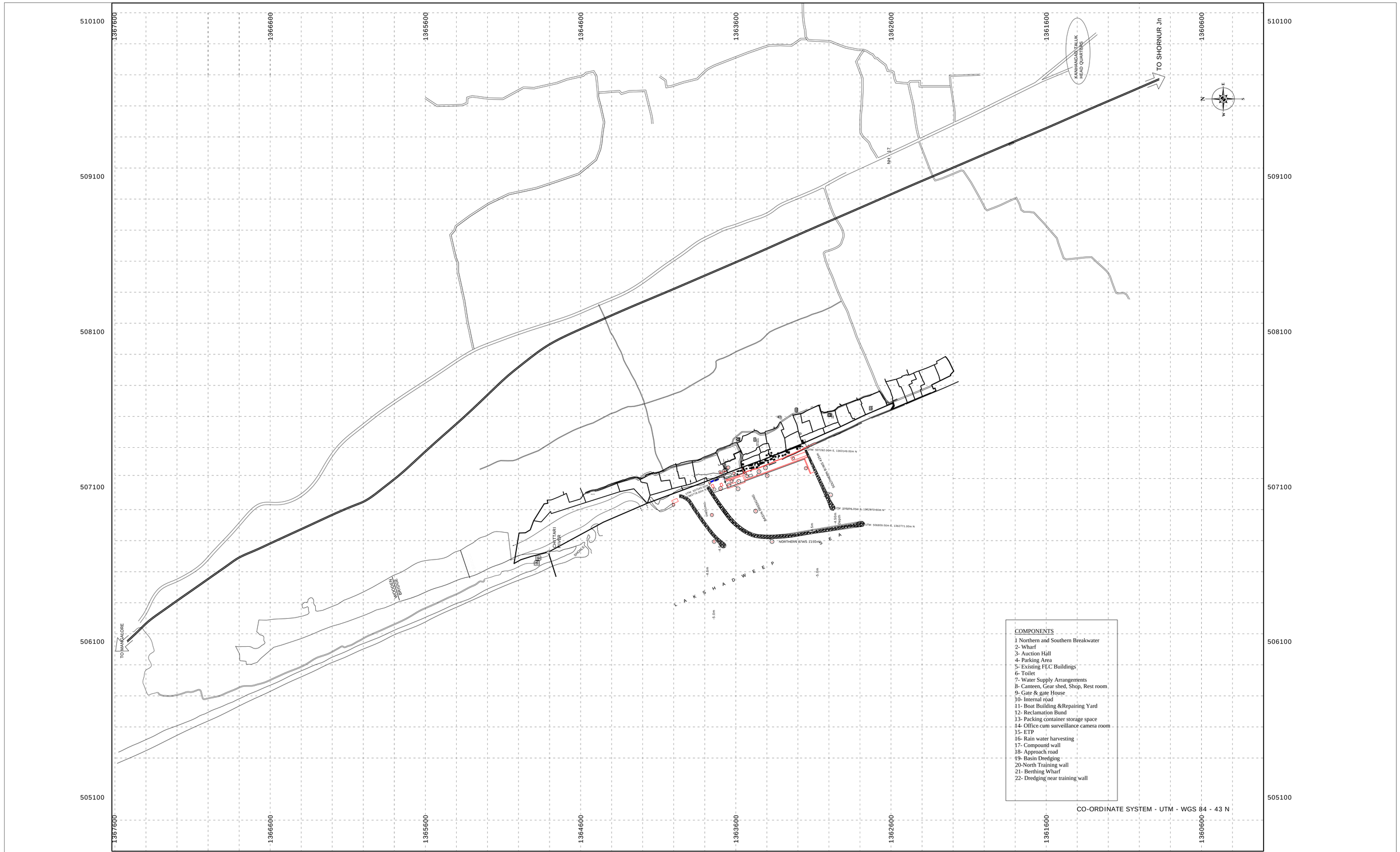




KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	01/24/AJNR	**ASSISTANT ENGINEER:** SIGNATURE:	**ASSISTANT EXECUTIVE ENGINEER:** SIGNATURE:
		DRAWN:			
TYPE:		**REVISION**	450	**EXECUTIVE ENGINEER:** SIGNATURE:	**SUPERINTENDING ENGINEER:** SIGNATURE: / **CHIEF ENGINEER:** SIGNATURE:
TITLE:	LOCATION MAP				



KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	2/ 24 / AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:8000		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	LAYOUT				

File No: HED(1)/7/2022-DRE Computer No: 16301
Generated from eOffice by Gisan L, HED(1)-HED, AE(1)1, HED, HARBOUR ENGINEERING DEPARTMENT on 8/28/2026 06:27 PM

2036413325 IT-HED

506100 507100 508100

1363600

1362600

N W E S

LAKSHADWEEP SEA

-4.5m -5.0m -4.0m

DREDGING

BASIN DREDGING

1150 m

NORTHERN B/WS 1150m

-4.5m -5.0m

-4.50m Depth

SOUTHERN B/WS 425m

UTM: 507045.00m E, 1363778.00m N

UTM: 507282.00m E, 1363149.00m N

UTM: 506896.00m E, 1362970.00m N

UTM: 506809.00m E, 1362771.00m N

Crescent school
Aswar kadapuram

Sri Kurumba

Rahmaniya Masjid

Anganvadi

COMPONENTS

1 Northern and Southern Breakwater
2- Wharf
3- Auction Hall
4- Parking Area
5- Existing FLC Buildings
6- Toilet
7- Water Supply Arrangements
8- Canteen, Gear shed, Shop, Rest room
9- Gate & gate House
10- Internal road
11- Boat Building &Repairing Yard
12- Reclamation Bund
13- Packing container storage space
14- Office cum surveillance camera room
15- ETP
16- Rain water harvesting
17- Compound wall
18- Approach road
19- Basin Dredging
20-North Training wall
21- Berthing Wharf
22- Dredging near training wall

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	2(a)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:2500		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	PROPOSED LAYOUT		452		

File No: HED/2013/2023-CRM (Computer No. 16367)
Generated from eOffice by Divya L, AE(CE)-HED, AE(CE) / HED, HARBOUR ENGINEERING DEPARTMENT on 16/06/2026 08:07 PM

506100 507100 508100

1363600

1362600

N W E S

UTM: 507045.00m E, 1363778.00m N

DREDGING

-4.0m

BASIN DREDGING

1150 m

NORTHERN B/WS 1150m

-4.5m

-4.50m Depth

UTM: 506809.00m E, 1362771.00m N

SOUTHERN B/WS 425m

UTM: 506896.00m E, 1362970.00m N

UTM: 507282.00m E, 1363149.00m N

Crescent school Asarur kadapuram

Sri kurumba

Rahmaniya Masjid

Anganvadi

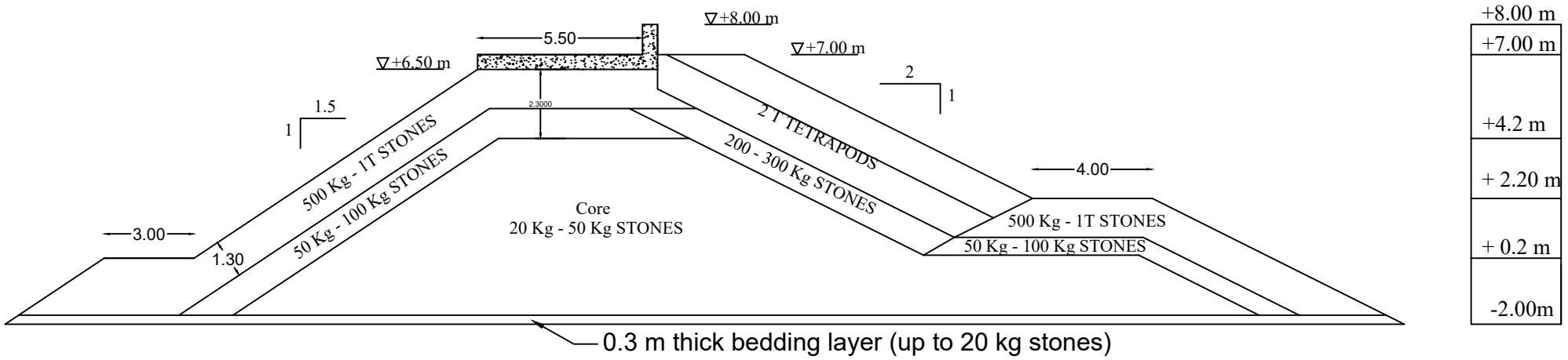
COMPONENTS

1 Northern and Southern Breakwater
2- Wharf
3- Auction Hall
4- Parking Area
5- Existing FLC Buildings
6- Toilet
7- Water Supply Arrangements
8- Canteen, Gear shed, Shop, Rest room
9- Gate & gate House
10- Internal road
11- Boat Building &Repairing Yard
12- Reclamation Bund
13- Packing container storage space
14- Office cum surveillance camera room
15- ETP
16- Rain water harvesting
17- Compound wall
18- Approach road
19- Basin Dredging
20-North Training wall
21- Berthing Wharf
22- Dredging near training wall

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	2(b) /24/ AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:2500		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	LAYOUT WITH CONTOUR		453		



Trunk section at -2.0 m Bed Level

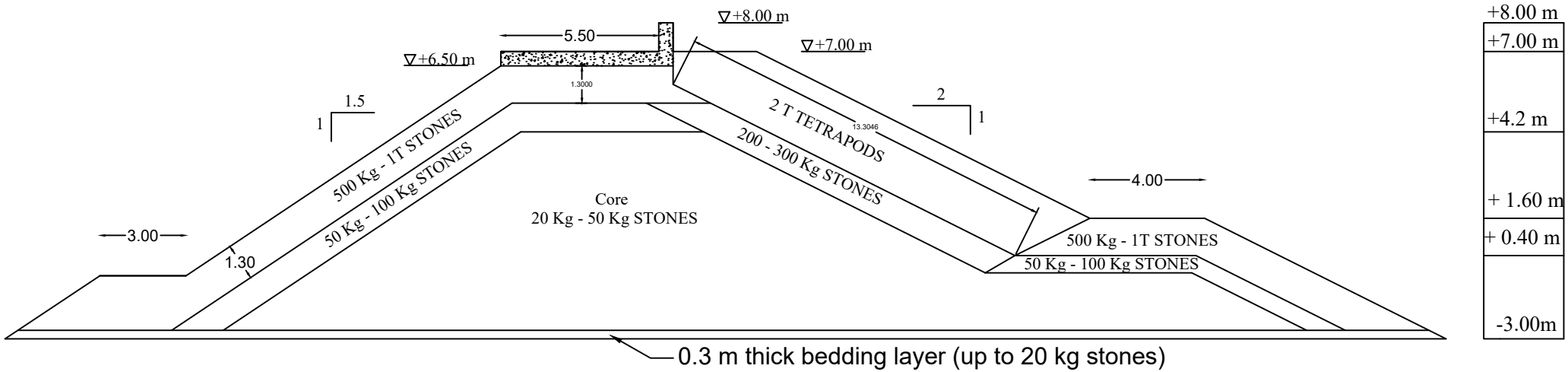
5 - 10kg Stones	13.84 sqm
20 - 50kg Stones	112.86 sqm
50 - 100kg Stones	24.19 sqm
200 - 300kg Stones	10.29 sqm
500 Kg - 1T Stones	47.50 sqm
2 T Tetrapods	11.07 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO:	3(a)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:200		
TYPE:	Break water and river training	REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE / CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -2.0 m bed level				

File No. HECE/[illegible]
Generated from [illegible] by [illegible] on KERALA STATE HARBOUR ENGINEERING DEPARTMENT on 19/06/2026 06:27 PM



Trunk section at -3.0 m Bed Level

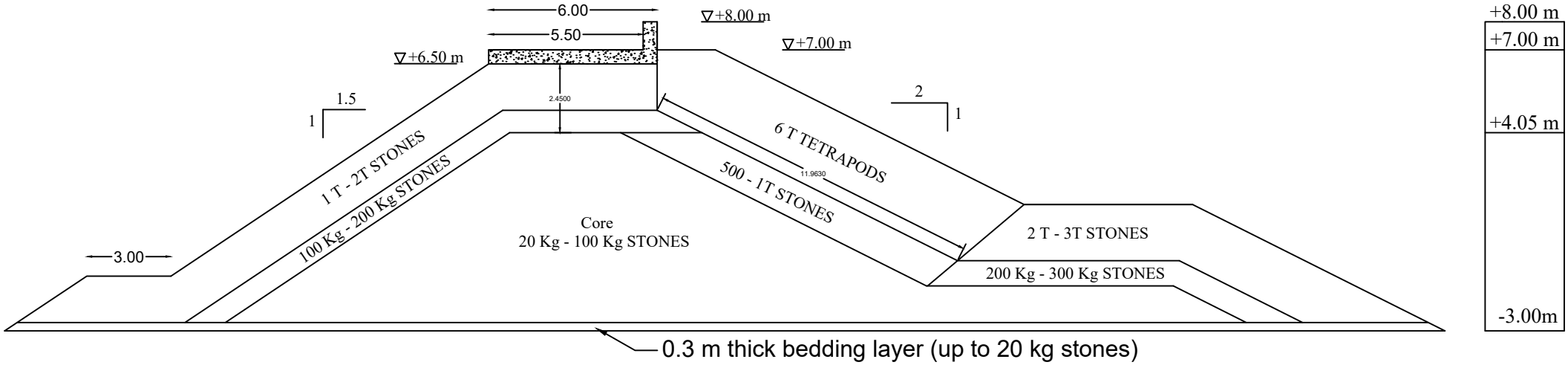
5 - 10kg Stones	14.89 sqm
20 - 50kg Stones	141.63 sqm
50 - 100kg Stones	25.99 sqm
200 - 300kg Stones	12.52 sqm
500 Kg - 1T Stones	49.84 sqm
2 T Tetrapods	13.30 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO:	3(b)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:200		
TYPE:	Break water and river training	REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE / CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -3.0 m bed level				

File No. HECE/207/2022-DR6 (Computer No. 19397)
Generated from eOffice by Gouri L, AE(C5)HED, AE(C5) HED, HARBOUR ENGINEERING DEPARTMENT on 18/03/2025 10:07 AM



Trunk section at -3.0 m Bed Level

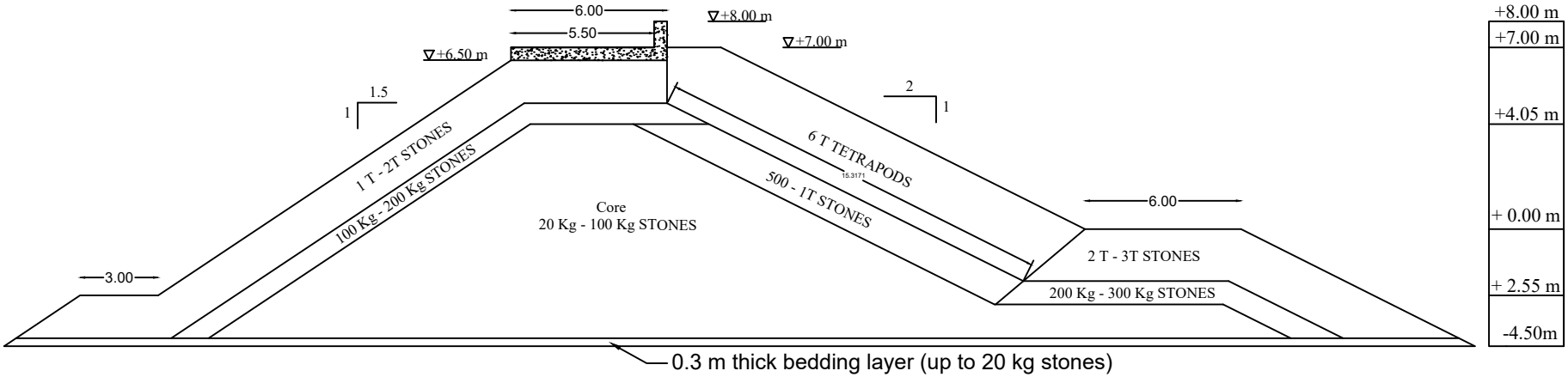
5 - 10kg Stones	15.24 sqm
20 - 100kg Stones	117.84 sqm
10 - 200kg Stones	15.26 sqm
200 - 300kg Stones	11.03 sqm
500 Kg - 1T Stones	14.45 sqm
1T - 2 T Stones	39.35 sqm
2T - 3 T Stones	28.21 sqm
6 T Tetrapods	12.00 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO:	3(c)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:200		
TYPE:	Break water and river training	REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE / CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -3.0 m bed level				

File No. HECE/2... Generated from website by ... HARBOUR ENGINEERING DEPARTMENT on 19/06/2026 06:27 PM



Trunk section at -4.5 m Bed Level

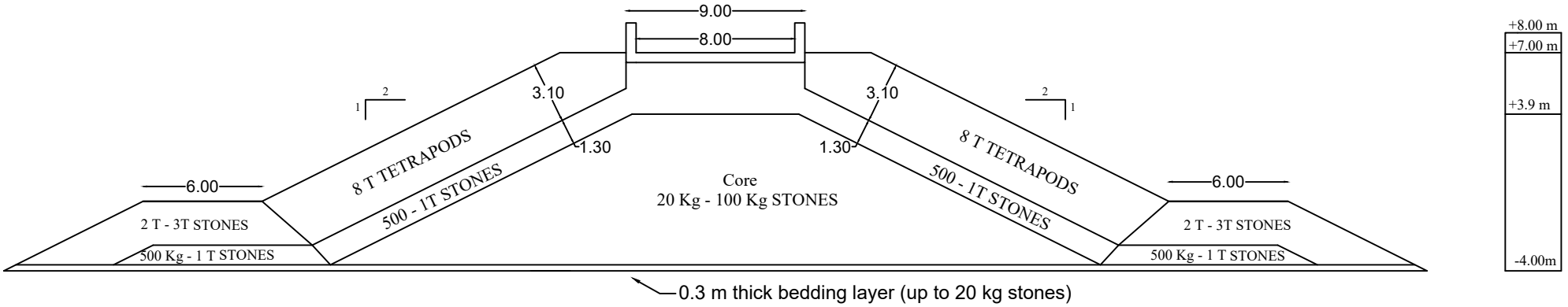
5 - 10kg Stones	16.81 sqm
20 - 100kg Stones	163.28 sqm
10 - 200kg Stones	17.42 sqm
200 - 300kg Stones	11.03 sqm
500 Kg - 1T Stones	18.89 sqm
1T - 2 T Stones	43.81 sqm
2T - 3 T Stones	28.21 sqm
6 T Tetrapods	15.31 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO: 3(d)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:250 457			
TYPE:	Break water and river training	REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -4.5 m bed level				

File No. HECE/207[illegible]
Generated from eOffice by Gouri L, AE(C5)HED, AE(C5) HED, HARBOUR ENGINEERING DEPARTMENT on 18/06/2026 06:27 PM



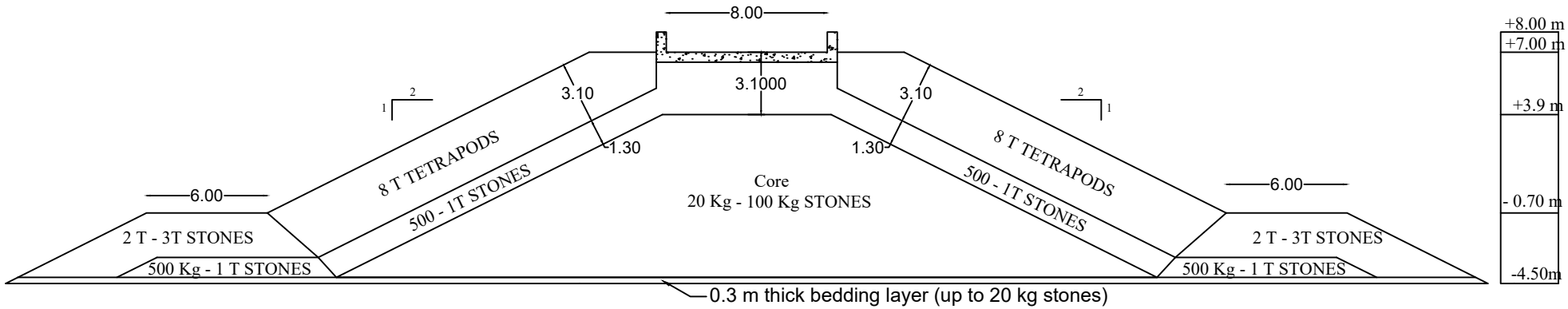
Round Head section at -4.0 m Bed Level

5 - 10kg Stones	21.32 sqm
20 - 100kg Stones	179.26 sqm
500 Kg - 1T Stones	86.99 sqm
2T - 3 T Stones	51.48 sqm
8 T Tetrapods	17.66 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO: 3(e)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:300			
TYPE:	Break water and river training	REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -4.0 m bed level	458			



Round Head section at -4.5 m Bed Level

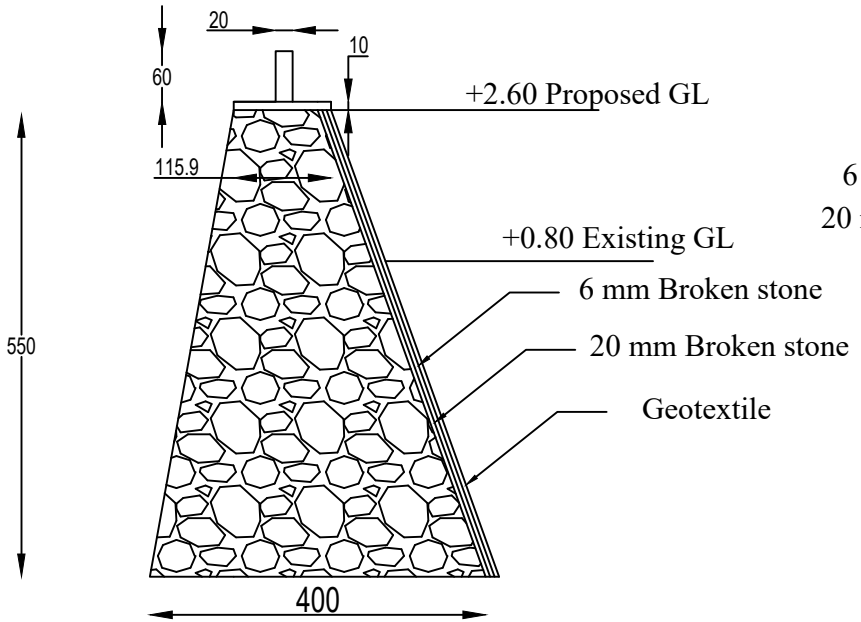
5 - 10kg Stones	21.92 sqm
20 - 100kg Stones	199.15 sqm
500 Kg - 1T Stones	89.90 sqm
2-3 T Stones	51.48 sqm
8 T Tetrapods	20.19 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

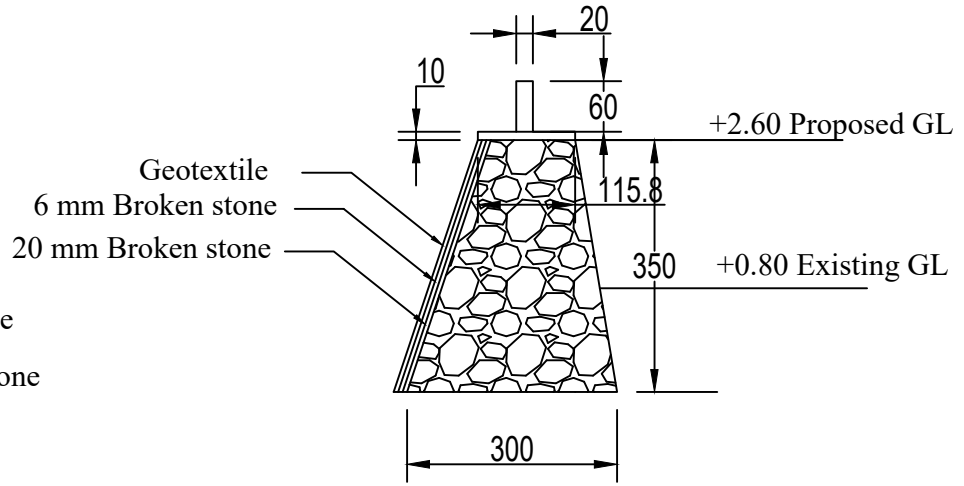
NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO: 3(f)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:300			
TYPE:	Break water and river training	REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -4.5 m bed level	459			

CROSS SECTION OF RECLAMATION BUND ALONG THE BASIN



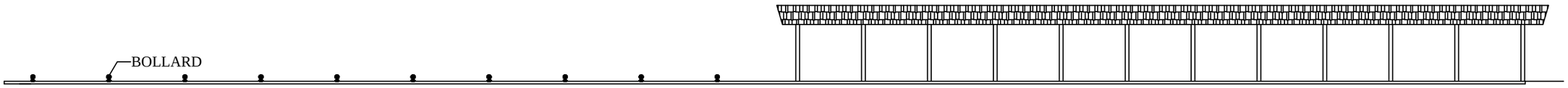
CROSS SECTION OF RECLAMATION BUND NEAR THE RIVER TRAINING AREA



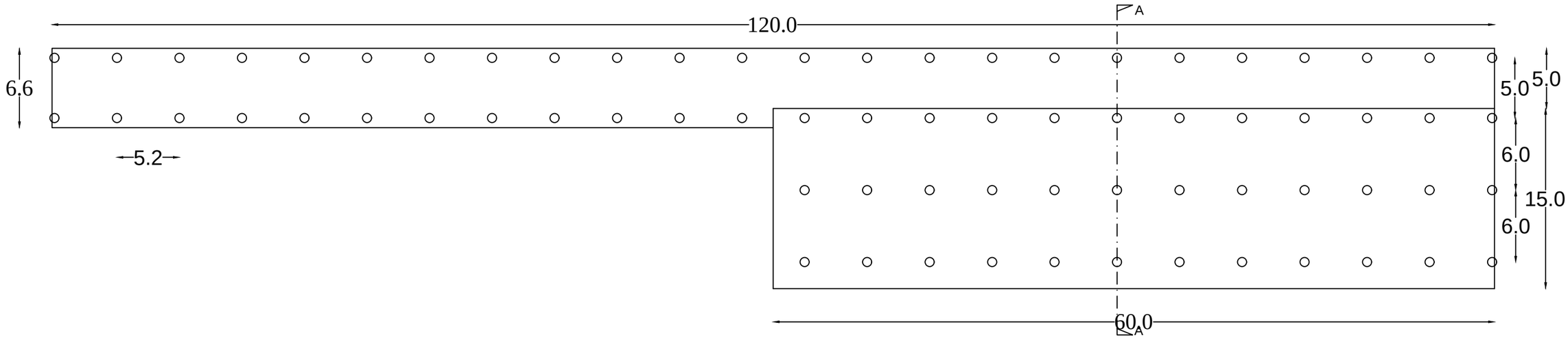
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO: 04/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:90			
TYPE:		REVISION 460	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	
TITLE:	DREDGING AND CONSTRUCTION OF RECLAMATION BUND				



FRONT ELEVATION

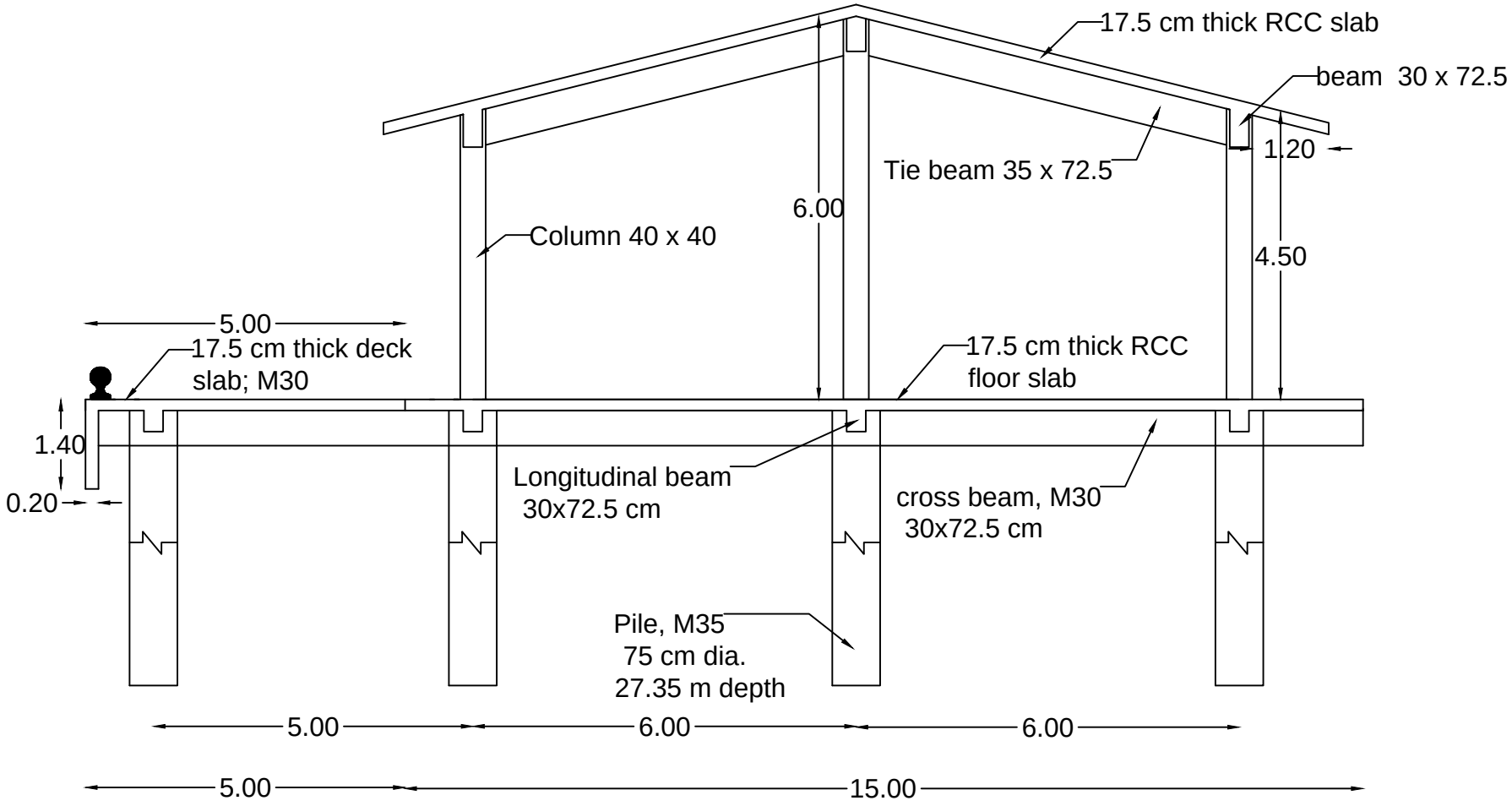


PLAN OF HARBOUR

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	5(a) /24 /AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		DRAWN:	1:350		
TYPE:		REVISION	461	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	WHARF AND AUCTION HALL				



SECTION AA

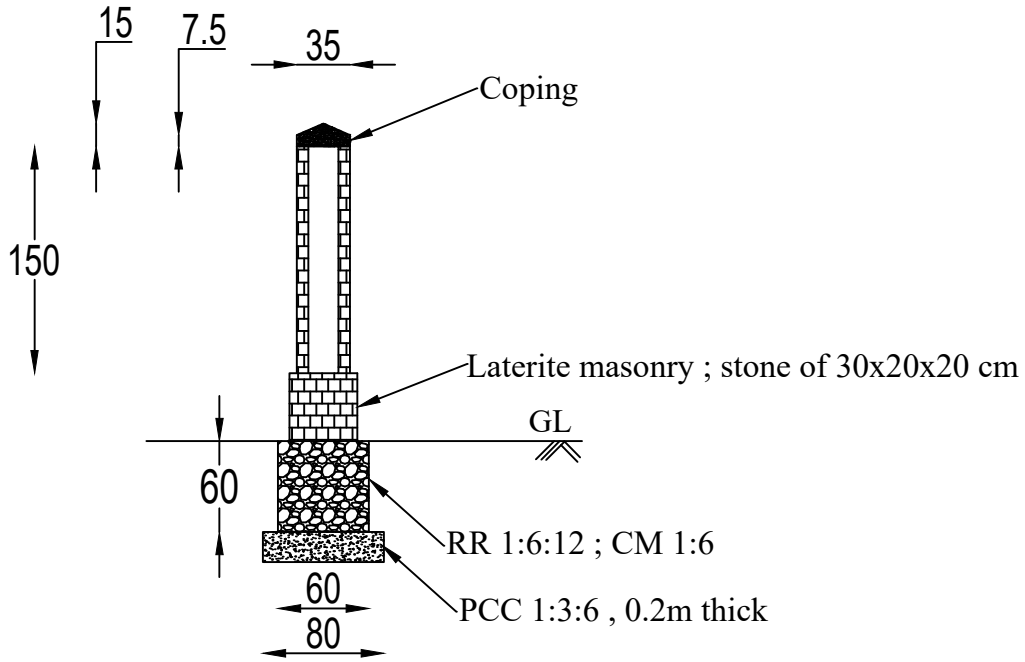
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

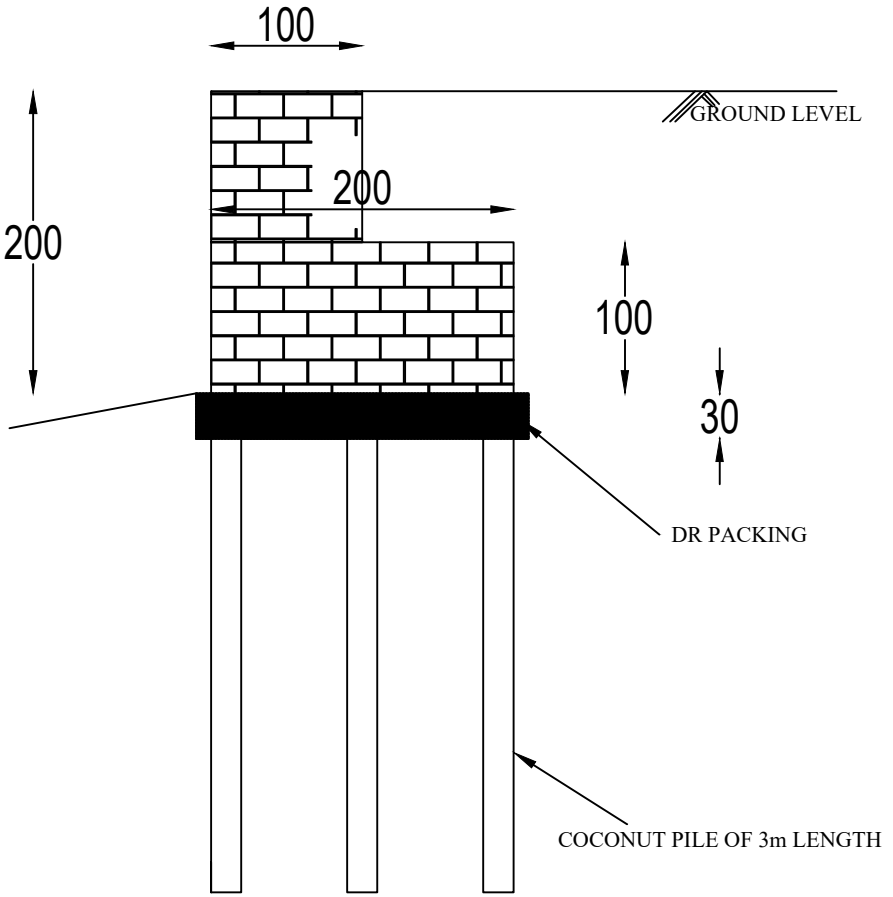
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		DRAWN: 1:100			
TYPE:		REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	
TITLE:	WHARF AND AUCTION HALL				

File No. HECE/207/2022-DR8 (Computer No. 19397)

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CROSS SECTION OF COMPOUND WALL



SIDE PROTECTION

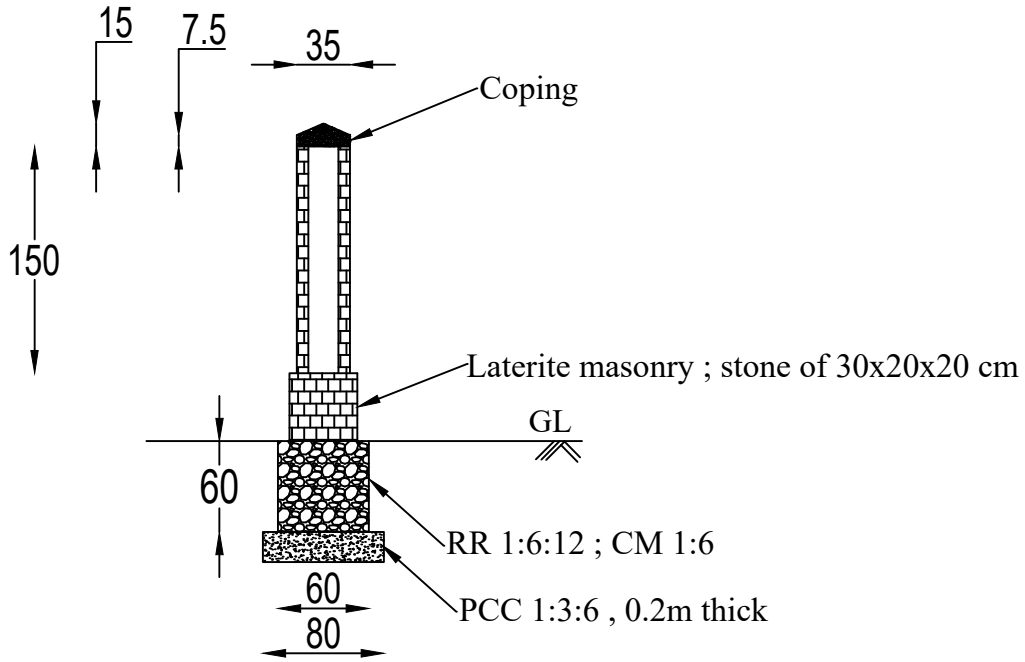
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

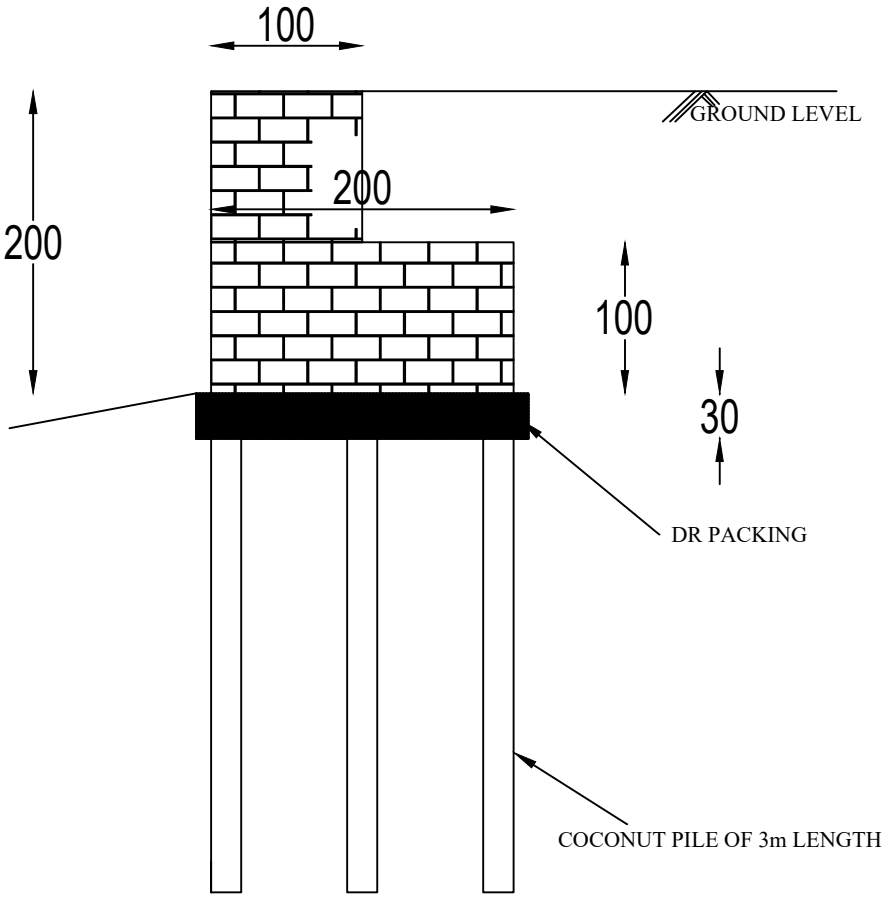
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		SCALE: 1:50			
TYPE:		REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	CHIEF ENGINEER: SIGNATURE
TITLE:	COMPOUND WALL AND SIDE PROTECTION				

File No. HECE/207/2022-DR8 (Computer No. 19397)

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CROSS SECTION OF COMPOUND WALL



SIDE PROTECTION

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

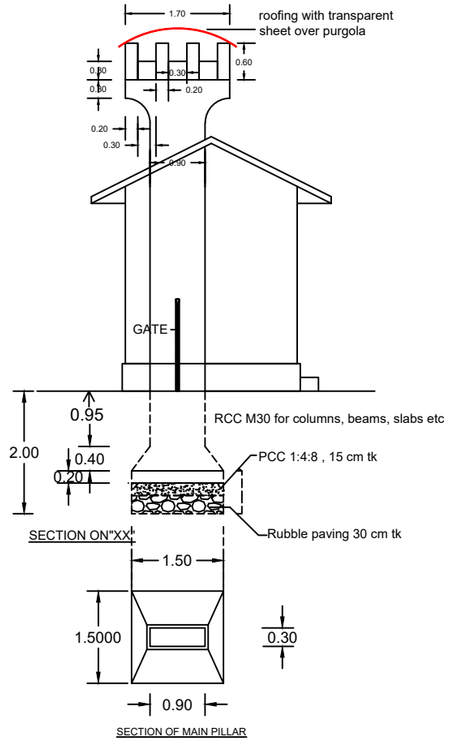
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TYPE:		REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	CHIEF ENGINEER: SIGNATURE
TITLE:	COMPOUND WALL AND SIDE PROTECTION				

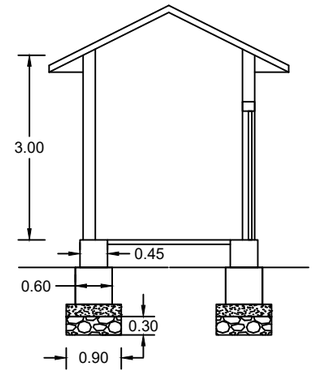
File No. HECE/207/2022-DR8 (Computer No. 19397)

Generated from eOffice by Gouri L, AE(C5)HED, AE(C5) HED, HARBOUR ENGINEERING DEPARTMENT on 18/06/2026 06:27 PM

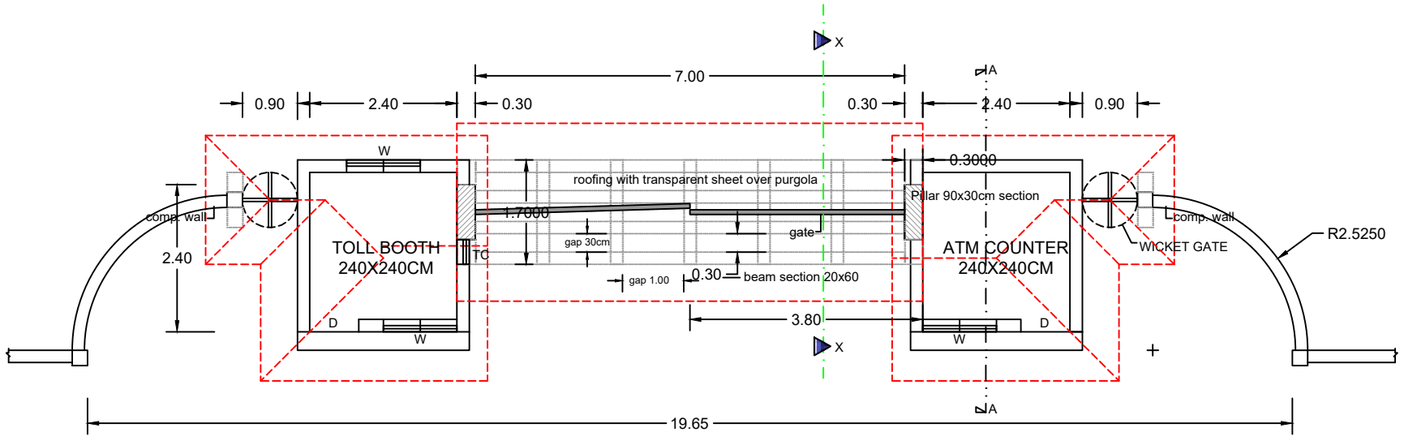


FRONT ELEVATION

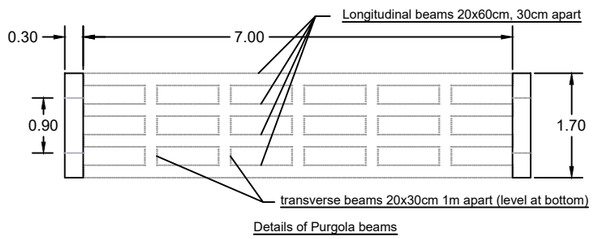




SECTION ON"AA"



PLAN OF GATE HOUSE



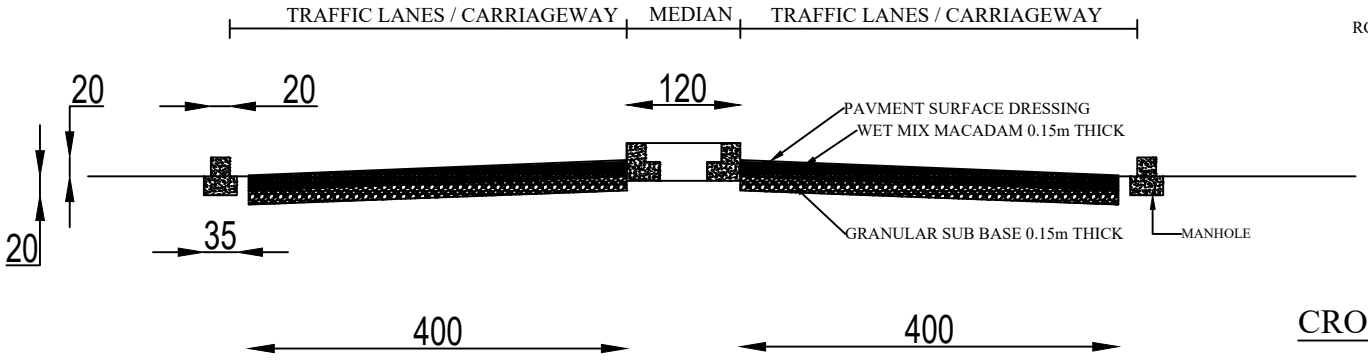
Details of Purgola beams

ALL DIMENSIONS ARE IN M

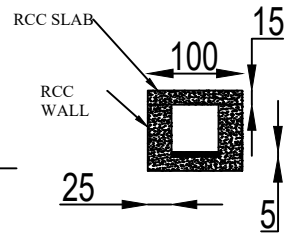
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

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CROSS SECTION OF ROAD

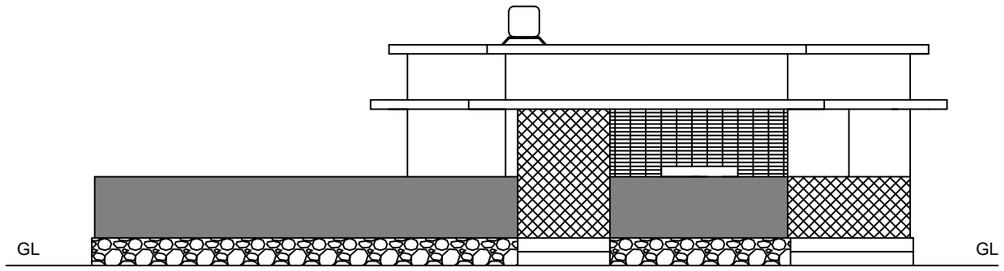


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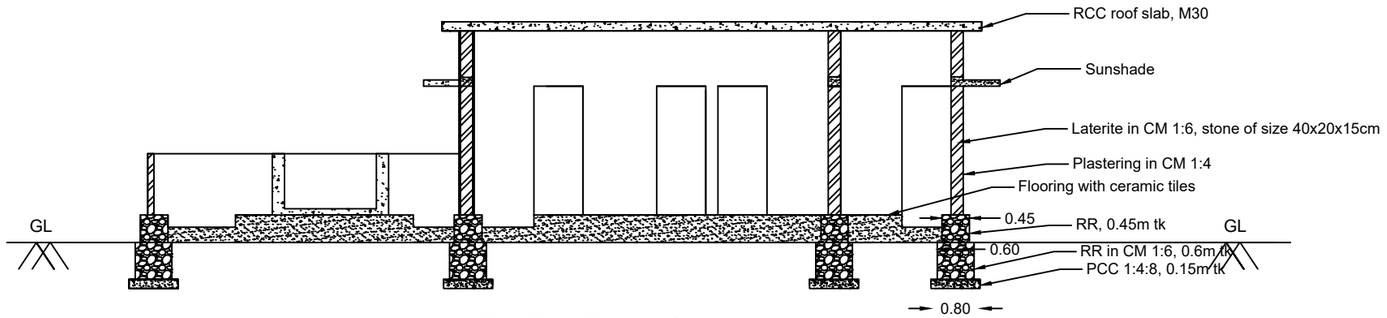
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

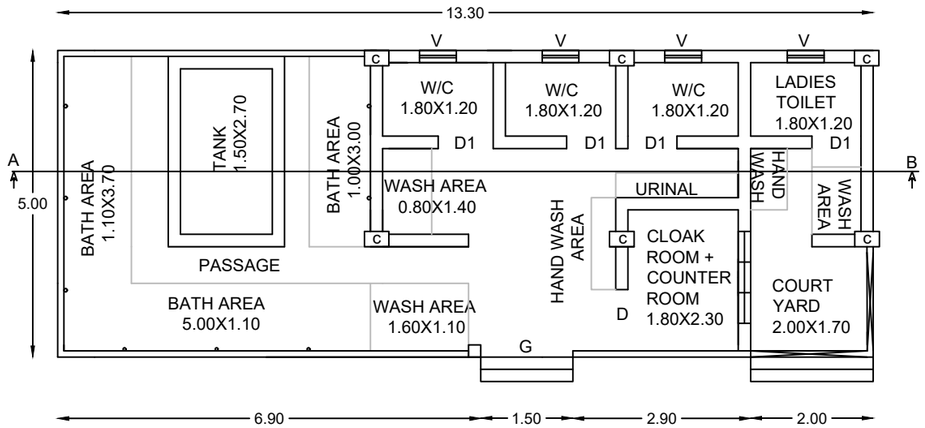
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TITLE:	INTERNAL ROAD, PARKING AREA & DRAINAGE FACILITY	466			



ELEVATION



SECTION AB



PLAN

INDEX

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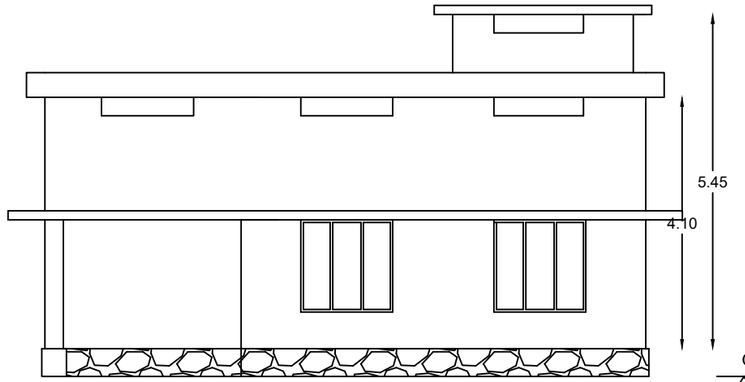
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KERALA STATE HARBOUR ENGINEERING DEPARTMENT

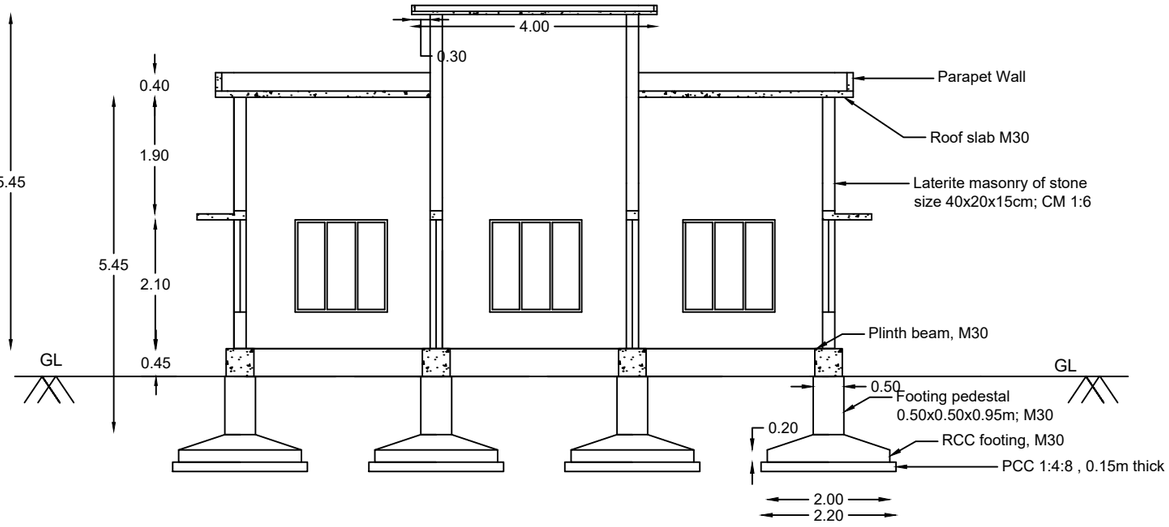
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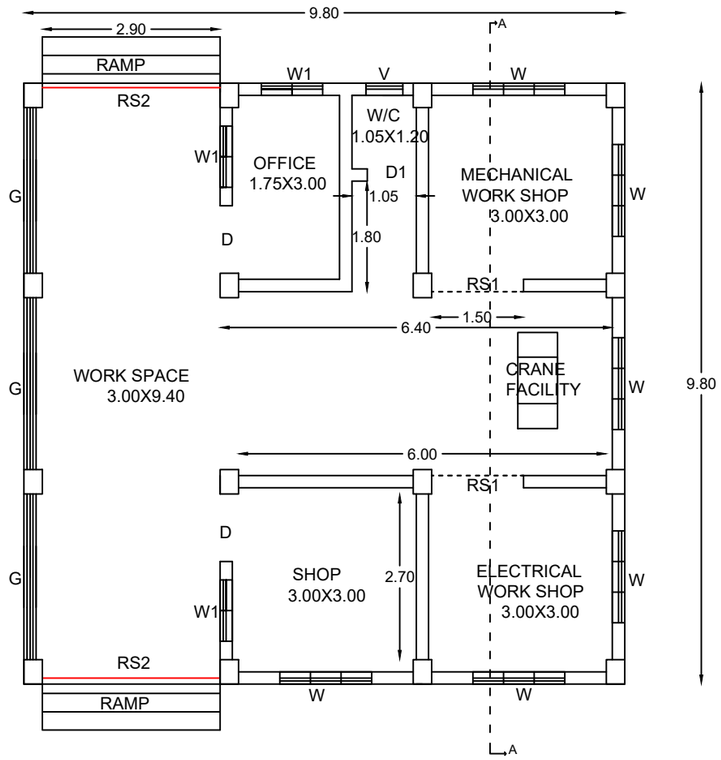
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ELEVATION



SECTION AA



PLAN

INDEX

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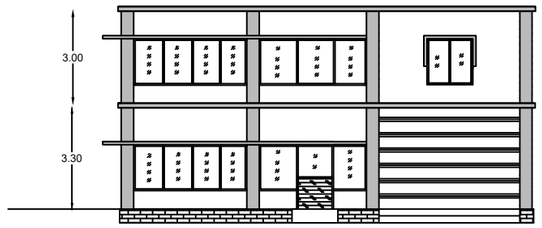
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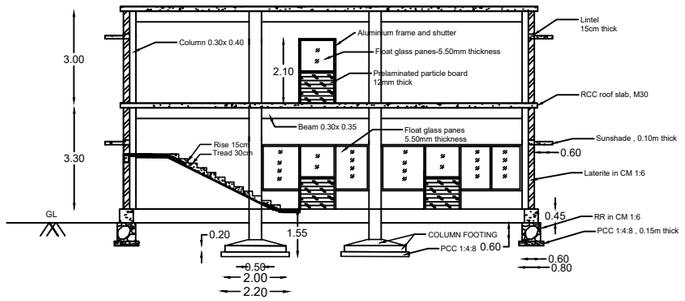
NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

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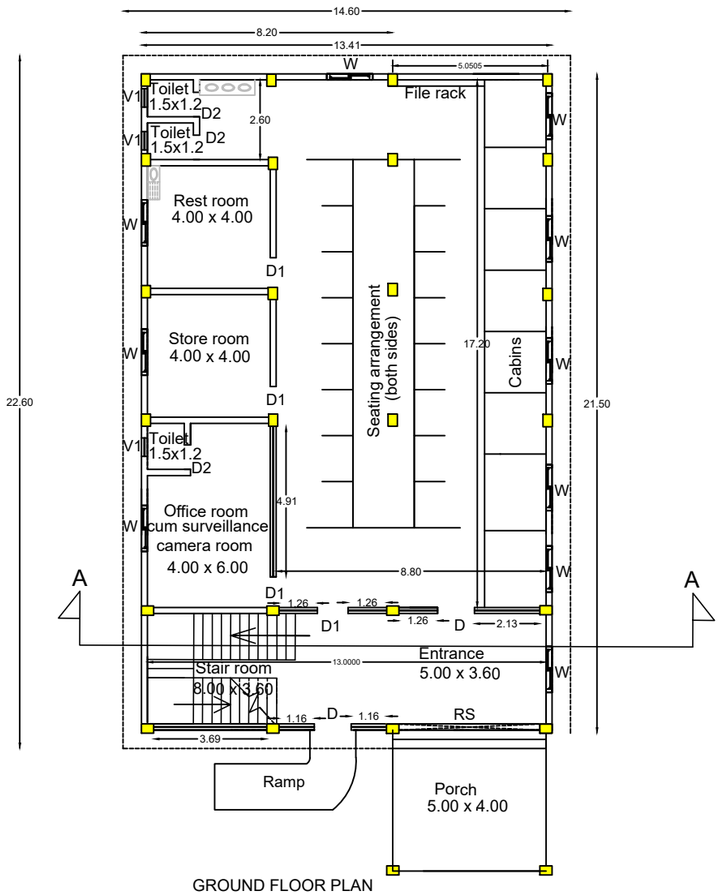
Ajanur Fishing Harbour - Construction of office room cum harbour surveillance camera room



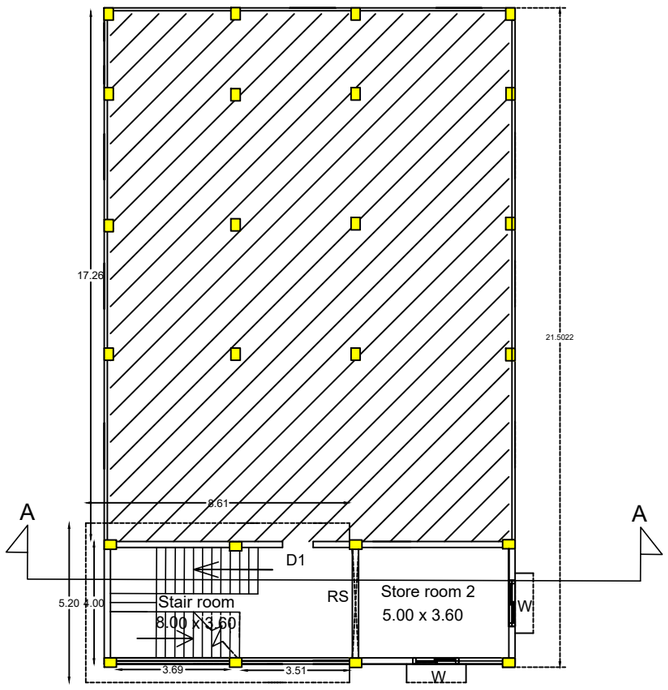
ELEVATION



SECTION A-A



GROUND FLOOR PLAN



FIRST FLOOR PLAN

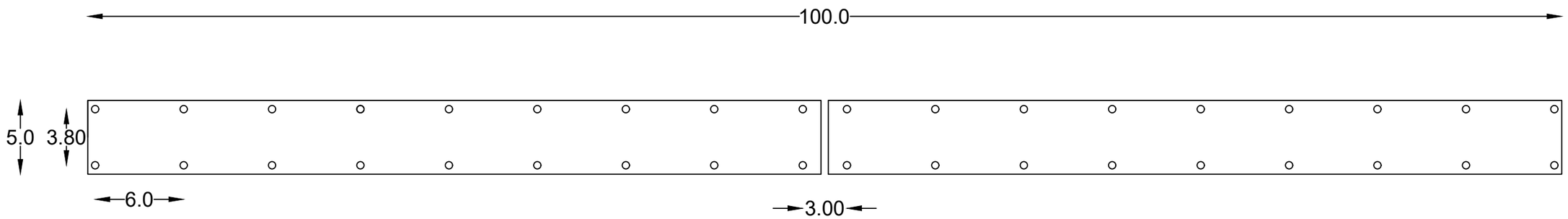
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KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

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BERTHING WHARF- PLAN

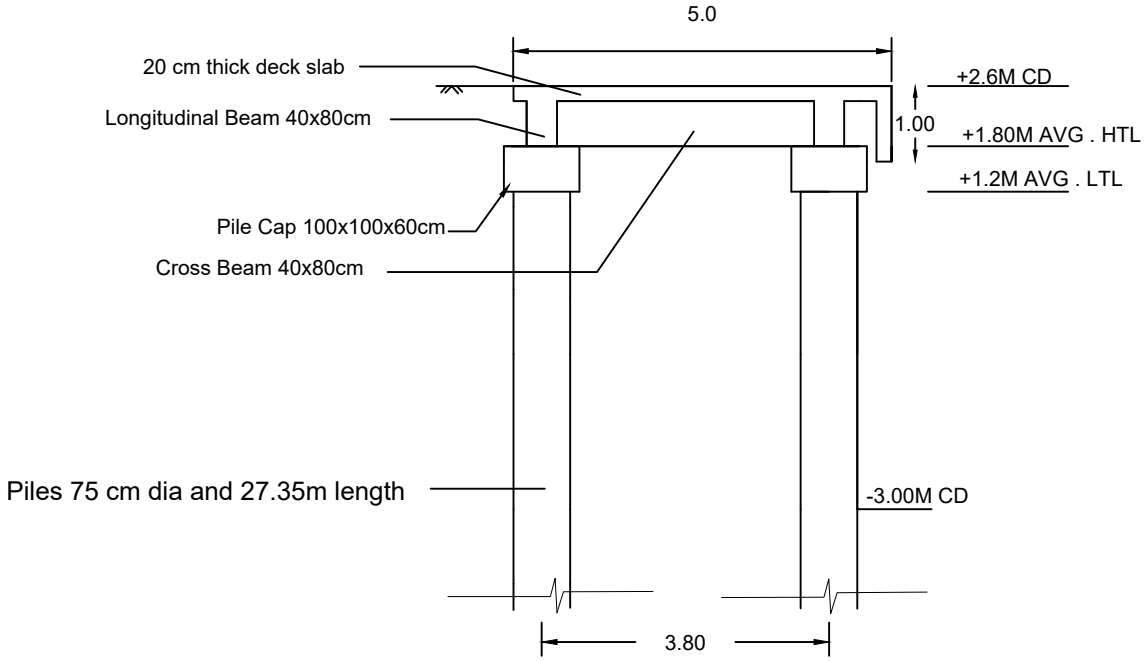
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NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

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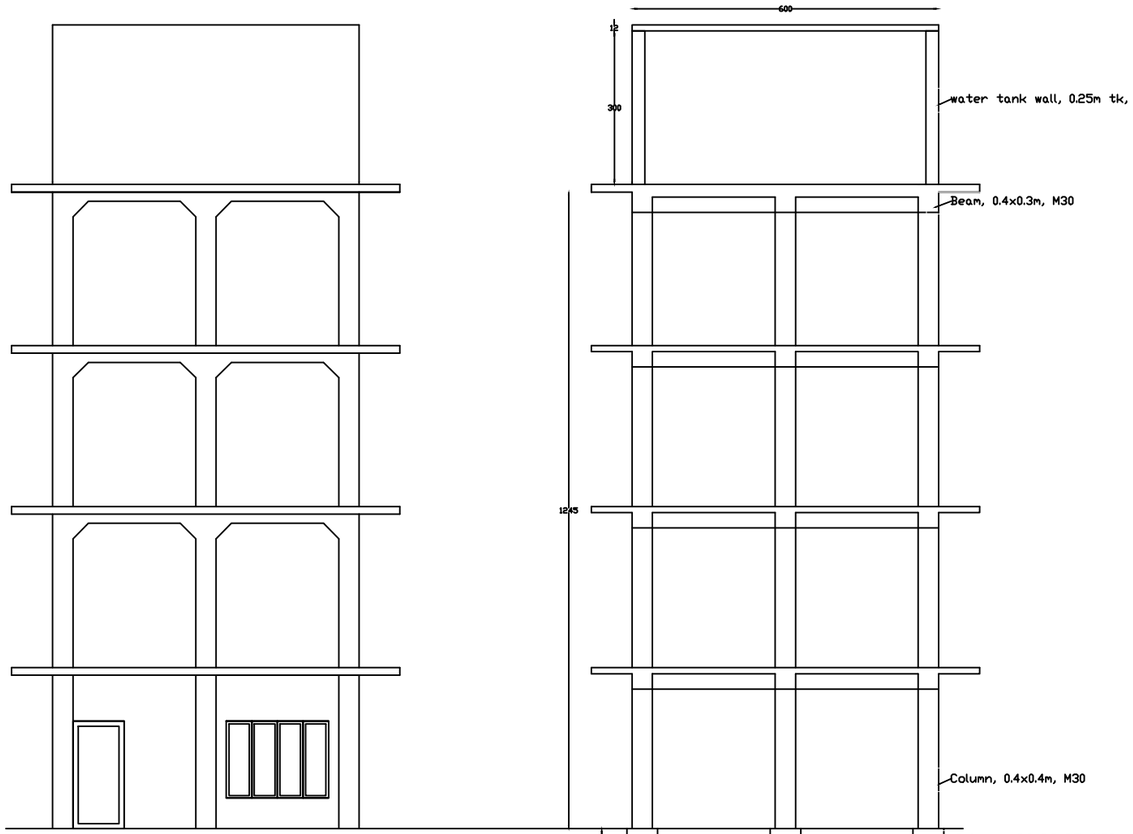


SECTION OF BERTHING WHARF

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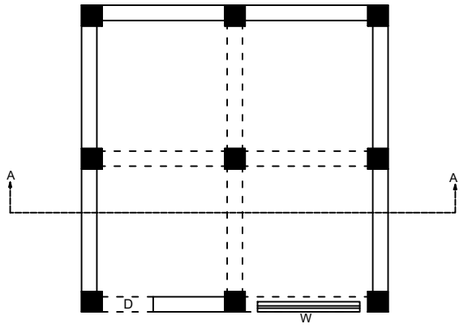
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ELEVATION

SECTION AA



PLAN

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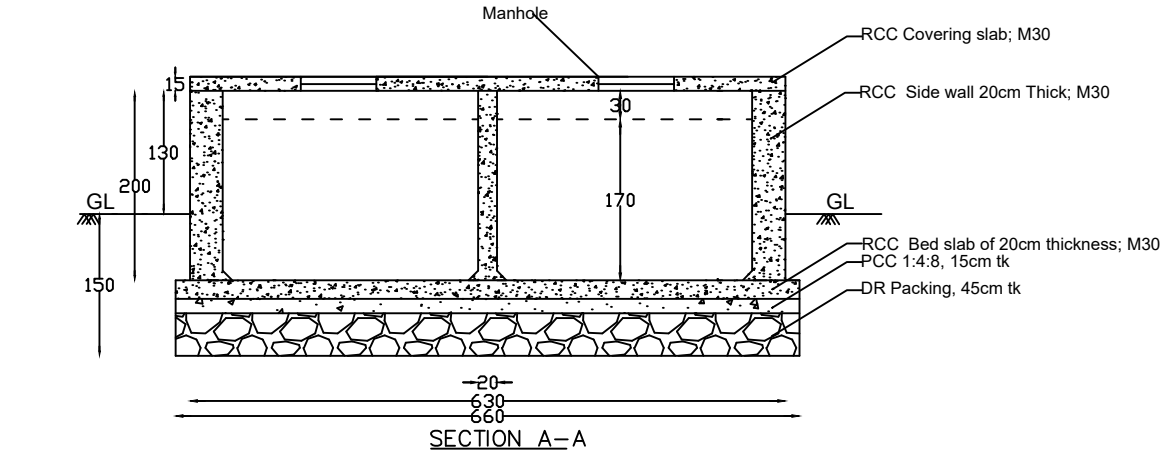
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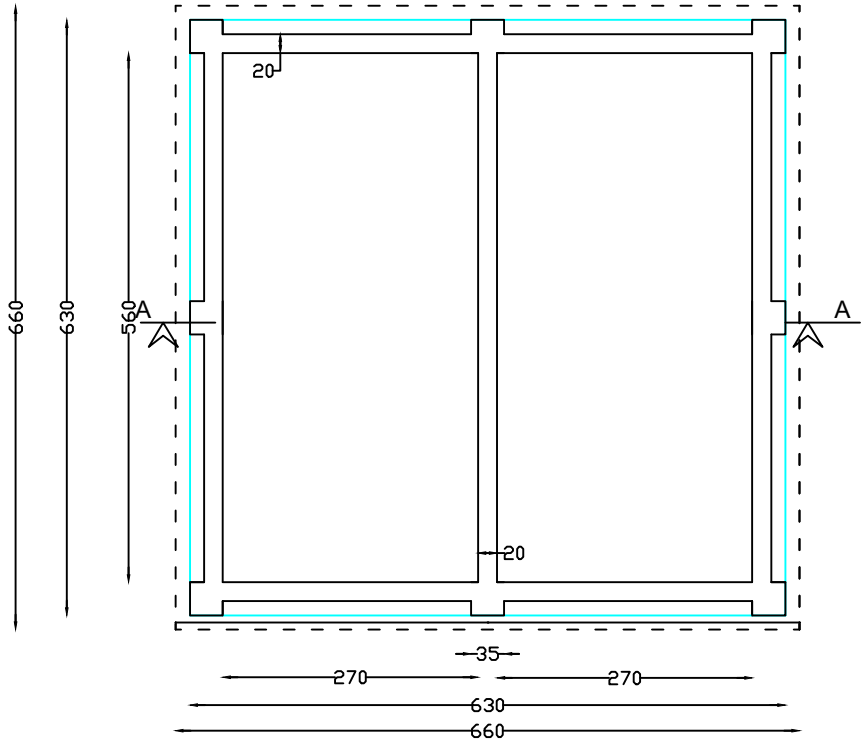
NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

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SECTION A–A



PLAN SUMP

KERALA STATE HARBOUR ENGINEERING DEPARTMENT	NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT				
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TITLE:	WATER SUPPLY ARRANGEMENTS- SUMP	473			

GOVERNMENT OF KERALA

Fisheries & Ports (B) Department

No.B2/228/2024/FandP 15-10-2025,Thiruvananthapuram

From
Special Secretary to Government

To
The Director of Fisheries,
Thiruvananthapuram

The Chief Engineer
Harbour Engineering Department,Thiruvananthapuram.

Sir,

Sub: Fisheries Department - Proposal for construction of Fishing Harbour at Ajanur, Kasargod, under PMMSY - Reg.

Ref: 1. Letter No. F.No.j-24001/6/2025-Fy from Government Of India. (copy enclosed)
2. Letter No.DFTVM/229/2022-K3 dated 07-11-2024 from the Director of Fisheries.
3. Letter No.HECE/517/2021-DR8 dated 17-10-2024 from the Chief Engineer, Harbour Engineering Department.

I am to invite your attention to the references cited and to forward herewith a copy of the letter at reference 1st cited for further necessary action.

Yours Faithfully,
ASBINA A V
UNDER SECRETARY
For Special Secretary to Government.

Approved for Issue,

File No. HECE/207/2022-DR8 (Computer No. 19397)

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Section Officer.

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15 JUL 2025

F. No. j-24001/6/2025-Fy
Government of India
Ministry of Fisheries, Animal Husbandry and Dairying
Department of Fisheries
***

Chanderlok Building, New Delhi
Dated the 8th July, 2025

To
The Principal Secretary
Government of Kerala
Department of Fisheries, Ports & Harbour Development
Thiruvananthapuram
(Email: prlsec.fisheries@kerala.gov.in)

Subject: Construction of Fishing Harbour at Ajanur, Kasargod , Kerala under PMMSY.

Sir,

I am directed to refer to letter No. B1/312/2024-F&PD dated 24-01-2025 on the subject noted above and to say that the proposal of Construction of Fishing Harbour at Ajanur, Kasargod, Kerala under PMMSY has been examined in consultation with Central Institute of Coastal Engineering for Fishery(CICEF), Bangalore and concluded that the cited project is economically not viable due to the following factors:-

(i) Proximity to existing fishing harbours-Kasargod and Cheruvattur are only 17 KM away;

(ii) High Construction costs- Breakwaters, training walls and dredging constitutes a significant amount;

(iii) Additional Costs involved in the environmental mitigation measures;

(iv) Limited number of mechanized fishing vessels-Only a small fleet operates in the proposed site area

2. It is, therefore, requested to kindly submit techno-financial viable proposals under the ongoing schemes of this Ministry for holistic development of fishers and fisheries sector in the region so as to enable to examine the matter further.

Yours faithfully,

(G. Ramakrishna Rao)
Assistant Commissioner (Fisheries)
Tel: 011-23310351

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GOVERNMENT OF KERALA

Harbour Engineering Department



CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DETAILED PROJECT REPORT

PRADHAN MANTRI MATSYA SAMPADA YOJANA

OCTOBER 2024

SYNOPSIS

Ajanur is a fishing village situated near ChithariRiver with an urban catchment of high population density. The river is to the north of Kanhangad Town in Kasaragod District. This area is a well-known fishing area in Kasaragod District and a number of fishing crafts operate from this area. Both the fishermen and the fishery industry of the region are persistently demanding for further development of the area. In addition to the demand for construction of a new fishing harbour, there have been persistent demands to make the Chithaririver mouth permanent and prevent the formation of the sand bars at the mouth.

The mouth of Chithari River is of migratory nature and often gets completely closed in summer seasons. The closing of the river mouth causes flash floods at the coastal areas where the estuary out falls in to the sea. People living on the upstream side of river face disaster due to this.The condition gets aggravated as the catchment or the storm drainage area of the river is densely populated urban area. The discharge from the river is not sufficient to flush out the sand bars created by coastal marine morphology, hence man made efforts are required on an annual basis to open the river mouth before monsoons. Another problem is the migratory nature of the river mouth, which moved far south in the last few years causing damages to the auction halls and other infrastructure created for fishery at the site.

Harbour Engineering Department entrusted Mathematical Model Studies to Central Water Power Research Station (CWPRS, Pune) for establishing a fishing harbor and for training work of ChithariRiver. The layout of breakwaters for construction of an open sea fishing harbor is based on this model study.

This detailed project report is prepared for the construction of an open sea fishing harbour and river training work along with other infrastructures at Ajanur in Kasaragod District in Kerala State under PMMSY. The master plan includes construction of north and south breakwaters, training wall on the north side based on CWPRS recommendations, wharf and auction hall, dredging and reclamation, berthing wharf, canteen, net mending shed, shop rooms, locker rooms, gate and gate house, office cum surveillance room, ETPetc .The estimated project cost including all the components is **20000lakh**The estimate is prepared using Kerala Government PRICE software, which is based on the DSR 2018 rates with current cost index for Kasaragod District (33.05%).

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Annexures **Ajanur Fishing Harbour – Calculation of wharf length, Cost Benefit Analysis, Soil Investigation Report, Mathematical Model Study Reports, Estimates, Drawings**

1. PROJECT SUMMARY

1.	Title of the project	Construction of Ajanur Fishing Harbour
2.	District	Kasaragod
	Taluk	Kasaragod
	Corporation/Municipality/Panchayath	AjanurGramaPanchayath
	Assembly Constituency	Kanhangad LAC
3.	Implementing agency	Harbour Engineering Department
4.	DPR prepared by	Harbour Engineering Department
5.	Project outlay	Rs. 20000 lakhs
6.	Nature of the project	Construction of new Fishing harbour
7.	Present status of existing Fisheries Infrastructure	Fish landing Centre
8.	Need for the project (Brief)	• Providing a safe harbour for the artisanal fishing operations in Kasargode District. • To improve the hygiene standards in post-harvest operations and ensure better product quality satisfying EEC/HACCP norms. • To promote responsible fishing practices as envisaged by FAO. • Providing training works for Chithari River to keep the estuary open and prevent inundation.
9.	Total estimated cost and item wise cost break up	Project Abstract of Estimate (Attached as Annexure)
	Whether detailed estimate attached?	Yes (Attached as Annexure)
10.	Details of revenue streams	User charges, Lease of rights
11.	Details of project risks	• Availability of Construction materials Availability of Labourers • Quarrying restrictions • Fund flow • Climate changes

12.	Details of project management organisation strategy	• Estimation, Technical Sanctions, Tendering and Agreement Execution will be done by Harbour Engineering Department • PRICE software is the tool for preparing, scrutinizing and transmitting the estimates. • Tendering will be done by inviting online e-tenders from pre-qualified contractors. • MS Project is the tool used for scheduling the projects. • Work Execution and preparation of Bills will be done by Harbour Engineering Department.
13.	Details of contract management strategy	• The Public Works manual of state government specifies the duties, responsibilities and delegated powers of officers in contract management. It also specifies fines for project delays and incentives for early completion. • HED will invite tenders, execute agreement and supervise the work.
14.	Details of Project Implementation Schedule (PIS) & Work Breakdown Schedule (WBS) Proposed duration to complete the project	WBS Bar Chart.
15.	Details of statutory clearances obtained	
16.	Quality Control infrastructure and mechanism	• Three tier quality control systems will be implemented. • First tier quality control will be done by the contractor. • The second tier quality control will be done by the QC wing of HED. • For third tier QC the service of a reputed

		institution outside HED will be utilized.
17.	Details of attached drawings	• Key Map of Project Location • General Layouts • Breakwater sections • Wharf and auction hall • Gate and Gatehouse • Net Mending shed, Locker room, Canteen, Shop rooms • Compound wall and Side Protection Works • Parking Area and Internal Road • Dredging and Reclamation bund • Wharf for berthing facility
18.	Other attachments	• General abstract • Detailed estimate • Model Study Report

2. INTRODUCTION

2.1 Location and Regional Setting

2.1.1 Ajanur is one of the prominent fishing villages of Kasaragod district with extensive fishing activity. The project site is situated near the estuary of Chithari backwaters and is located inAjanur Gram Panchayath in KasaragodTaluk. Project site is located at 12.33° Latitude and 75.06° Longitude.

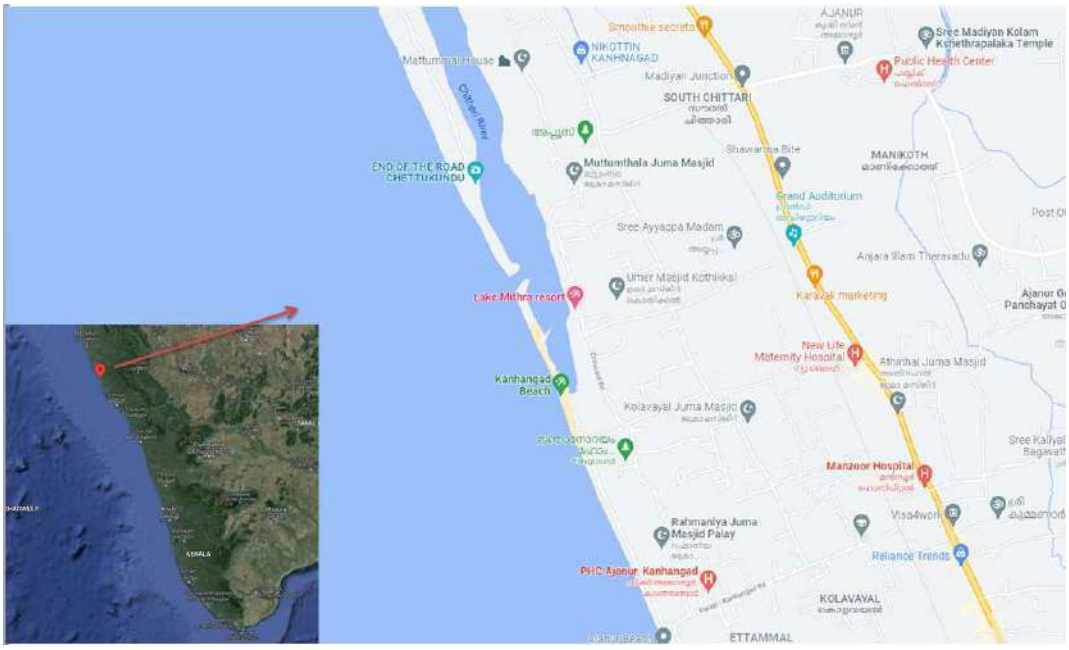


Figure 2.1 Location map of proposed fishing harbor site

2.1.2 The site is easily accessible from major roads through a network of coastal roads. The proposed project site is located 17 km north of existing Cheruvattur Fishing Harbour and 17km south of Kasargod Fishing Harbour.

2.2 Necessity of the Proposal

2.2.1 In order to meet the temporary needs of the poor fishermen of the area, a fish landing center was constructed, accessible through the Chithari River, as part of ICAD project. There is an auction hall, net mending shed and toilet block situated at the southern bank of estuary of Chithari River. But, this landing centre is not fully used by the fishermen due to the inadequate facilities.

2.2.2 Here, use of landing centre is mainly dependent on availability of shore in front of it. Sometimes, shore is eroded very close to auction hall, and any further erosion may lead to the collapse of the structure. Local fishermen demanded to have a jetty in front of it, and other additional facilities. Protection wall is also necessary to avoid soil erosion from the land. There is also demand from the fishermen of nearby area of Chitharikadappuram to construct a fish landing center for them also. All these point to the extensive fishing operation of the region. Fishing villages from Hosdurg to Pallikkara will be benefited by the project.

2.2.3 At present, the fishermen of the locality carry out their fishery activities from Chithari River. The coastal morphological changes at this river mouth are highly complex. The migration of the river mouth and the formation of sand bars have caused considerable loss of human life and land property in this area. During the onset of monsoons and when there are heavy rains in the catchments upstream, the closing of the river mouth causes extreme problems like flash floods all along the highly populated upstream area, and the people here are reportedly rehabilitated to safety each time.

2.2.4 The fishermen venturing in to the sea or coming back with the catches face extreme danger at the river mouth due to presence of sand bars. Many lives have been lost in the last few years due to this. Also the fishing vessels and engines are damaged. The river mouth needs to be manually dredged to avoid sudden flashfloods during the onset of monsoon. Often the government machinery fails to do this in time causing flood related disasters to the people living upstream. Hence there is an urgent requirement to provide necessary river training work of Chithari River to arrive at a permanent solution to the problems faced by the local population.

2.3 The Proposal

2.3.1 This proposal is put forward to construct a fishing harbour to provide necessary infrastructure facilities to cater to the needs of the locality.The mouth of Chithari River is of migratory nature and often gets completely closed in summer seasons. The discharge from the river is not sufficient to flush out the sand bars created by coastal marine morphology, hence man made efforts are required on an annual basis to open the river mouth before monsoons. Provision for training work of

Chithari River is also included in this proposal to address the issues caused by the migratory nature of the river and to keep the estuary open. Width of the channel provided is 130m which is not sufficient for the safe navigation of the vessels in rough season.Hence it is proposed to construct an open sea harbour

2.3.2 This proposal consists of provisions for construction of north breakwater of 1150m length and south breakwater of 425 m length, river training work of 435 m length,wharf, auction hall, dredging and reclamation, canteen, net mending shed, shop rooms, locker rooms, gate and gate house, etc.As per the model study report (No: 6283) shore protection measuresneeds to be provided on north and south side of the development after monitoring the shore line changes post harbour construction which is explained in the conclusion 7.0 (v and vi) as

"If the erosion on the south side of the proposed fishing harbour is progressive after the development then a suitable shore protection measure in the form of a seawall or series of groynes may be provided."

and

"If the shifting of the river mouth is pronounced after the proposed development of the river training works then a seawall of appropriate length may be provided to arrest the shifting of the river mouth."

Hence the provision for this component is not included in this DPR which may be taken up later.

2.3.3 The estimates were prepared using Kerala Government's PRICE software, which is based on the CPWD data, DSR 2018 rates and the current cost index for Kasargod District. The total cost for the proposed fishing harbour at Ajanur comes to **Rs.20000 lakh**

3. BACKGROUND INFORMATION

3.1 General

3.1.1 Kerala is blessed with a coastline of 590 km and having extensive brackish water lakes and estuaries. With a total fishermen population of more than 14 million and rich marine and inland water resources, fisheries and aquaculture forms an important sector with regard to activities in the state. Kerala occupies a premiere position in Indian fisheries by contributing about 13% of the marine landings fishing industry which has employment, livelihood, and food security of the country. The state has been a pioneer in introducing several innovative measures in harvest and post-harvest technologies in India. The technological advancements in fisheries have considerably influenced the fishing zone substantially in the last four decades with the continuous intensification of the fishing effort contributes significantly to economic, social and nutritional wellbeing of the people.

3.1.2 Fishery industries occupy an important role in the economy of Kerala. The export of fish products from Kerala worth approximately Rupees 6971 Crore, making it 12% share of India in value and 13% in quantity.

3.2 Fisheries sector in Kerala at a Glance

3.2.1 A brief outline of the fishery details of Kerala state is given below:

- 590 km Coastline
- 222 Marine and 113 Inland Fishermen Villages
- 10.54 Lakh Fishermen Population
- About 6.01 Lakh Metric Tonne Marine Fish Production
- About 15% Share in India's Total Annual Marine Fish Production

3.3 Fisheries Infrastructure in Kerala

3.3.1 Construction and commissioning of a number of fishery harbours and landing centres, introduction of new generation fishing craft and gears - both in the traditional and mechanised sectors, NCDC assisted motorisation programme for

traditional craft implemented by Matsyafed (Kerala Government undertaking), various social welfare measures taken to improve the living standards of fishermen like housing, roads, water supply schemes, fisheries schools etc, have brought considerable development to the fisheries sector of the state during the last decades. Out of the 25 fishery harbours in the state, 22 are operational and balance 3 are at various stages of construction. All harbours constructed in the state are by the Harbour Engineering Department. The detailed status of the Fishery Harbours in Kerala is given below:

Table 3.1 List of Fishing Harbours in Kerala State

No	Harbour	Nature	Location	Remarks
1	Vizhinjam	Mechanised	Thiruvananthapuram	Operational
2	Muthalapozhy	Mech. & Traditional	Thiruvananthapuram	Completed
3	Thangassery	Traditional	Kollam	Completed
4	Neendakara	Mechanised	Kollam	Completed
5	Chethi	Mech. & Traditional	Alappuzha	Work in Progress
6	Arthungal	Mech. & Traditional	Alappuzha	Work in Progress
7	Thottappally	Mechanised	Alappuzha	Completed
8	Kayamkulam	Mech. & Traditional	Alappuzha	Completed
9	Munambam	Mech. & Traditional	Ernakulam	Completed
10	Chellanam	Mech. & Traditional	Ernakulam	Completed
11	Chettuva	Mech. & Traditional	Thrissur	Completed
12	Ponnani	Mech. & Traditional	Malappuram	Completed
13	Thanur	Mech. & Traditional	Malappuram	Completed
14	Parappanangadi	Mech. & Traditional	Malappuram	Work in Progress
15	Beypore	Mechanised	Kozhikode	Completed
16	Puthiyappa	Mechanised	Kozhikode	Completed
17	Koyilandi	Mech. & Traditional	Kozhikode	Completed
18	Chombal	Traditional	Kozhikode	Completed
19	Vellayil	Mech. & Traditional	Kozhikode	Completed
20	Thalai	Mech. & Traditional	Kannur	Completed
21	Azheekkal	Mechanised	Kannur	Completed
22	Moplabay	Mech. & Traditional	Kannur	Completed
23	Cheruvathur	Mech. & Traditional	Kasargod	Completed
24	Kasargod	Mech. & Traditional	Kasargod	Operational
25	Manjeswaram	Mech. & Traditional	Kasargod	Completed

3.4 Resource Potential

3.4.1 According to the available estimates of potential fishery resources of the West Coast, particularly in the south-west coasts, Kerala possesses the richest fishing grounds in the region. Studies estimate that about 8 Lakh metric tonne of marine fish can be sustainably harvested from Kerala waters.

3.5 Marine Fish Production

3.5.1 The actual landing efforts of the traditional craft are virtually confined to 0 to 20 m and mechanised craft upto 50 m. The present level of marine fish production in the state is about 6 lakh tonnes per annum. Hence about 2 lakh tonnes of fish within the maximum sustainable yield is still left un-harvested.

Table 2.2 Marine Fish production of Kerala through 2011-12 to 2021-22

Year	Production in Lakh T
2011-12	5.53
2012-13	5.31
2013-14	5.22
2014-15	5.24
2015-16	5.17
2016-17	4.88
2017-18	4.84
2018-19	6.09
2019-20	4.75
2020-21	3.91
2021-22	6.01

3.5.2 This can be harvested only by increasing the number of fishing days, by providing safe landing facilities, improving the fishing gears, improving the operating range of vessels by providing safe berthing facilities wherever possible.

3.6 Shore Based Facilities

3.6.1 Shore based facilities like ice plants, cold storages etc., are available all along the coastal region. Rigorous fishing activities are already going on in and around the fishing villages of the state.

3.6.2 The shore-based facilities now available at Thiruvananthapuram district will be capable to take care of the additional landing due to up gradation of the fishery harbour. A well-developed road network connecting the coastal belt and the hinterlands makes the transportation of fish and fish products easier. Railways also play a major role in the transportation of fish products.

3.7 Fish Marketing

3.7.1 Fish, Prawns and other High Value Catches are usually auctioned at the local centres immediately after landing. Local private agencies collect most of the prawn for processing.High Value Catches landed will be allocated to export market and about 80% of the rest of the fish landed is taken to the inland markets. The financial institutions in the area as well as co-operative bodies provide financial assistance for marketing.

3.8 Ownership and Management of fleets

3.8.1 Individuals or fishermen groups own traditional as well as mechanized crafts in most of the cases. Matsyafed plays a prominent role in coordinating the entire fishing activities in the fishing villages. Banks and societies also provide financial assistance for the repair of the vessels, purchase of OBMs, fishing gear and other capital investments.

3.9 Fishery Development Programmes

3.9.1 For the proper planned development of fishing industries in Kerala, modernization of existing crafts, introduction of new generation crafts, processing and marketing, landing and shore-based facilities are essential prerequisites.

3.9.2 Basic need for fishing operation either in mechanized or artisanal sector is a sheltered harbour basin, and adequate berthing and anchoring facilities. Kerala is

much ahead in providing these facilities. By now 21 fishery harbour projects are completed and few projects are progressing.

3.9.3 This has brought a sizable income to the fishermen community and the social status has improved very much during the past two decades. Now the focus of the Government is to complete the projects already started, expand the existing one to meet the present day demands and also to improve the facilities in the existing harbours to international standards. State Government is adopting a comprehensive approach towards this, which includes improvement of hygienic standard, providing adequate post-harvest infrastructure and cold storages, facilities for fish processing and value addition.

3.10 Fishing Activities in the Project Region

3.10.1 The general background information regarding the coastal areas of the district is summarised below.

Table 3.3 General Background Information

Kasaragod District		
1	Length of coastline	70 km
2	% Coastline of Kerala state	11.86 %
3	Fish Landings per Year	35163 T
4	% Landings of Kerala State	4.38 %
5	Total Fishermen Population 2022-2023	45919
	Male	18548
	Female	17129
	Children	10206
	Active Fishermen	10928

(Source: Fisheries Guide 2023, Fisheries Department, Kerala)

3.11 Fishing Villages

3.11.1 The details of major marine fishing villages of Kasargod district are given below

Table 3.4Major marine fishing villages of Kasargod district

KASARGOD DISTRICT (16 Nos)			
Sl. No.	**Name of Fishing Village**	**Revenue Village**	**Panchayath**
1	Thrikaripur	Valiyaparambu	Valiyaparambu
2	Valiyaparambu	Valiyaparambu	Valiyaparambu

3	Padannakadappuram	Padanna	Valiyaparambu
4	Thaikadappuram	Neeleswaram	Neeleswaram
5	Kadangode	Cheruvathur	Cheruvathur
6	Poonjakadappuram	Kanhangad	Kanhangad
7	**Hosdurg**	**Hosdurg**	**Kanhangad**
8	**Ajanoor**	**Chithari**	**Ajanoor**
9	**Pallikkara**	**Pallikkara**	**Pallikkara**
10	Kottikulam	Uduma	Uduma
11	Kizhoor	Kalanad	Chemmanad
12	Kasaba	Kasaragod	Kasaragod
13	Kavungoli	Kudlur	MogralPuthur
14	Koyippady	Koyippady	Kumbala
15	Shiriya	Mangalpady	Mangalpady
16	BengaraManjeswar	Hosabettu	Manjeswar

3.12 Benefited Population:

3.12.1 The population of Hosdurg, Ajanoor and Pallikkara fishermen villages is the direct beneficiaries of the project. Population details and fishermen statistics of these villages are shown below.

Table 3.5 Beneficiary Details

Sl. No	**Fishermen Village**	**Population**	**No. of Registered Fishermen**
1	Hosdurg	1575	354
2	Ajanoor	2965	793
3	Pallikkara	2554	991
Total		**7094**	**2138**
Fishermen statistics. Source: Fisheries Dept.			

3.12.2 Statistics of registered fishing crafts is shown in the table below.

Table 3.6 Details of Fishing Vessels Registered at the Base

Sl. No	Fishermen Village	No. of Fishing Crafts		
		Motorised Non Mechanical	Motorised Mechanical	Non Motorised
1	Hosdurg	165	41	9
2	Ajanoor	207	4	13
3	Pallikkara	181	5	8
	Total	**553**	**50**	**30**
Source: ReAL Craft Portal, Dept of Animal Husbandary, Dairying and Fisheries, GoI				

3.13 Marine Fishery Potential of the Kasaragod Region

3.13.1 The annual landings of Kasaragod District during 2003 to 2022 are given below.

Table 3.7 Annual Landings of Kasaragod District

Year	Landings (Tonnes)
2013-2014	38382
2014-2015	51902
2015-2016	45418
2016-2017	28689
2017-2018	52224
2018-2019	35163
2019-2020	12364
2020-2021	19259
2021-2022	20123

(Source: Fisheries Guide 2023, Fisheries Department, Kerala State)

3.14 Fish Marketing

3.14.1 The fish landed are generally auctioned at the auction hall and the local vendors take the fish to export and inland markets. There is a well-developed road network to take the fish to all major inland markets. The site is easily accessible from major roads through a network of coastal roads.

4. MATHEMATICAL MODEL STUDY

4.1 General

4.1.1 Harbour Engineering Department entrusted the model study for constructing an open sea fishery harbour at Ajanur, and river training work of Chithari River near the harbour to CWPRS Pune.

4.1.2 The CWPRS conducted model study and recommended layouts based on the study. It was decided to construct two rubble mound breakwaters of 1150m at the northern side and 425m at the southern end providing a tranquil basin inside the harbour. The northern breakwater of the harbour also acts as river training on one side of Chithari River. Rubble mount breakwater of length 435m is proposed on the other end of the river for river training work. They also conducted desk and wave flume study and recommended the optimum cross-sections for the breakwaters.

4.2 Tidal Levels and Currents

4.2.1 The proposed site of development is about 25 km south of Kasargod. The tides in the region are semidiurnal in nature. The maximum tidal range at Kasargod is about 1.0 m. Tidal currents are generally parallel to the coastal line. Important tidal levels at Kasargod with respect to Chart Datum are reported to be as under:

- MHHW : +1.40 m
- MLHW : +1.30 m
- MSL : +1.0 m
- MHLW : +0.90 m
- MLLW : +0.40 m

4.3 Sediment Characteristics

4.3.1 Bed samples were collected from different locations at the proposed site at Ajanur. Based on the analysis of the bed samples, the average D_{50} is 0.064 mm in sea and D_{50} in river is 0.210 mm. Water samples are collected at river and sea point to estimate the Suspended Sediment Concentration (SSC). It was observed that SSC varies at river point from 0.1 mg/L to 0.15 mg/L. Whereas, variation of SSC is between 0.05 mg/L to 0.11 mg/L at Sea point. The average SSC is 0.210 mg/L and 0.08 mg/L at river and sea point respectively.

4.4 Discharge Data

4.4.1 The river Chittari carries minimal discharge during monsoon and almost no discharge during the non-monsoon season. It was observed that during the time period of field data collection, discharge in the river is only due to influence of tidal fluxes. The river discharge of $6m^3/s$ is obtained through river ADCP observations was considered for non-monsoon season and for monsoon season, $25m^3/s$ discharge was considered for modelling.

4.5 Modelling Techniques

4.5.1 MIKE 21 HD was used to study the hydrodynamics. For studying the sedimentation, MIKE 21 MT module was used. These modules are used for the existing and proposed layouts.

4.6 Littoral Drift

4.6.1 Littoral drift studies reveal that annual southward and northward transports are 0.531Mm3 and 0.118Mm3 respectively with the net and gross transports being 0.413Mm3 and 0.649Mm3 respectively. Due to littoral drift, accretion and erosion are taking place on the north and south sides of the proposed development, respectively. The shoreline evolution after 10 years is predicted as accretion on the northern side extending up to 2500 m along the shore and about 68 m in cross shore direction, and as erosion on the southern side extending up to 1500 m along the shore and about 40 m in cross-shore direction. It was observed that the shifting of the river mouth is about 200 m towards the north over a year.

4.7 Flume Studies

4.7.1 Desk and wave flume studies were conducted to evolve the cross-section of breakwater based on the actual site survey data and other hydraulic parameters. Design of breakwater with tetrapods in the armour was evolved based on the desk and wave flume studies.

4.7.2 The hydraulic stability tests were conducted in the wave flume by reproducing the section to a Geometrically Similar model scale of 1:29. For the design of breakwater, water level of 2.60 m was considered as the Design Water Level, 1.40 m above the HWL (Storm Surge + Sea level rise). The significant wave height of 4.0 m was considered for the design of breakwater

4.8 Conclusions of Study

4.8.1 The final layout for the fishing harbour was decided based on the layout options proposed based on wave tranquillity study. An open sea harbour with north breakwater of 1150 m length, south breakwater of 425 m length and 435 m breakwater as river training work at the mouth of Chittari river is adopted as the final layout.

4.8.2 The sedimentation pattern for the proposed condition shows sedimentation of the order of 0.045m per annum near the river mouth. Sedimentation is also noticed near the north and the south breakwaters (0.05 m in a year). In the fishing harbour area sedimentation of about 0.03 m in a year is estimated.

4.8.3 If the erosion on the south side of the proposed fishing harbour is progressive after the development then a suitable shore protection measure in the form of a seawall or series of groynes may be provided.

4.8.4 If the shifting of the river mouth is pronounced after the proposed development of the river training works then a seawall of appropriate length may be provided to arrest the shifting of the river mouth.

5. SMART INFRASTRUCTURE AND AUTOMATED SYSTEMS

5.1 Introduction

The Third Industrial Revolution or Digital Revolution refers to the technological progress from analogue circuits and mechanical devices to the digital technology we use today. In the late 1990s and 2000s, the Information Technology (IT), with its high performance and low cost of computers and high capacity and speed of communications such as the Internet, contributed greatly to the efficiency and globalisation of transactions. In the 2010s, IT has shifted to the Information and Communication Technology (ICT), emphasizing the importance of communication technology between people and between people and things, and the sharing of information and knowledge through network communication. ICT includes not only traditional communication devices such as PCs and smartphones, but also the Internet of Things (IoT) and the use of big data. Advances in the Third Industrial Revolution have made human intellectual work more efficient.

The Fourth Industrial Revolution is characterised by emerging technological innovations in areas as diverse as robotics, AI, nanotechnology, biotechnology, quantum computing, IoT, 3D printing and virtual reality. In recent years, the widespread use of the Internet and high-speed communications in all areas of the industry, society and life has led to the connection of people through PCs, smartphones and tablets, and also to the connection of things through the IoT. In addition, services with a variety of applications are becoming more readily available. In particular, developments in robotics and AI technology have the potential to change the way we work. The Digital transformation (DX), the concept that digitization changes social life, the economy and business for the better, is being promoted.

5.2 Objectives and effects of ICT and IoT utilization

Electronic auctions have long been widespread in fishing harbour markets, and online auctions are now available from anywhere in the world, without the need to visit the market. The website of the fishing harbour provides not only information about the auction, but also about the restaurants in the harbour and its surroundings. Good information spreads quickly through social networks. The number of personnel at the auction hall is also decreasing. There are PCs in the administration office, and

communication with buyers and masters or owners of fishing boats is done via the internet rather than by telephone. Automatic sorting and grading machines are used for certain species of fish, as it is difficult to sort and grade fish manually. ICT, IoT utilization refers to the computerization of information from paper form to electronic form and the internet of people and things. In this way, ICT, IoT utilization can be seen in the operation of fishing harbours, and the use also seems to be reaping the benefits of these technologies.

The followings are the objectives and effects for which ICT and IoT are used so that fishing harbours can fulfil their roles and functions properly:

i Ensuring transparency, parity and fairness;

Dissemination of information via the internet & website, etc.

ii Efficiency in sales operations;

Weighing scale, sorting & grading machine, electronic auction, etc.

iii Maintaining and increasing sales;

Greater participation of buyers, including from outside the local, through electronic and online auction

iv Ensuring safety and quality;

Labelling, electronic record for the HACCP system, etc.

v Ensuring resource management;

Electronic recording and reporting catch and sales information, etc.

vi Ensuring traceability and sustainability;

Electronic issue of invoices and labelling, etc.

vii Improving safety of navigation and fishing operation; and

Electronic information, etc.

viii Efficiency in financial management, etc.

Electronic record

5.3 Dissemination of information via the internet & website

A fishing harbour is the base of the fishing industry, where the catch is landed and sold, and where processing and distribution are concentrated. People involved in the fishing industry want to be able to access information about the fisheries, the fishing industry and the fishing harbour. On the other hand, the administrator and operator of the fishing harbour and market are required to ensure transparency, fairness and equity in their administrations and operations. These imply the importance and necessity of disclosure and provision of information.

5.3.1 Internet & website

As a method of disclosure and provision of information, it is appropriate to make use of ICT, which is widely used in industry and daily life. The administrator and operator use the internet to set up a website, post information on the website, and make the information available to users. Confidential information, which is inappropriate for disclosure and which identifies the user, can be made accessible only to users who registered in advance and enter your ID and password in the dedicated login.

5.3.2 Contents of information

The information provided on this site is broadly classified into the following categories: information about the Harbour Authority, information about the fishing harbour, information about the fishing industry, information about the market, information about safety and quality of fish and fishery products and other useful information. The users of the information include fishermen, buyers and other traders, processors, transporters and suppliers of ice and oil. Depending on the nature of the information provided, the users of that information also differ.

In the case of a harbour authority setting up a website, the following is a list of appropriate contents of the information:

1 Harbour administration’s information

- Mission
- Organization (Organizational structure, board members, staff)
- Documents (Annual financial plan and report)

2 Harbour information

- Roles or functions (Roles or functions of harbour and market)
- History (History, development of harbour)
- Layout of harbour facilities (Breakwaters, quays, waterways, basins, handling hall, auction hall, administration office, freezing and refrigeration facilities, buyer's warehouses, parking lots, fishing vessel building and repair yard, fishing gear drying ground, processing factories, logistic terminal, etc.)
- Hinterland (Fishing communities or town)
- Harbour services (Landing fish, idling vessels and preparing for fishing, cranes and hosts for fish landing, fishing vessel building and repair yard (boatlift, slipway, dry dock), ice supply, water supply and fuelling, lending and collecting fish boxes, fuelling facilities, etc.)
- Rules for use of harbour facilities and services

3 Fisheries information

- Types of fisheries (Fixed-net fishery, purse sein fishery, trawl net fishery, etc.)
- Fishing fleet (Overhaul length, horsepower, gross tonnage, types of fisheries, fishing grounds, etc.)
- Fish and fishery products (Fish caught, landed or unloaded, auctioned, processed fishery products)
- Fishery product processing and marketing

4 Sales information

- Collection of landings (i.e. landing station or landing point)
- Auction (How the auction works, landing times, auction days/times).
- Fishermen (Register (ID and password), How you can provide landings information. fees and charges, rules and forms)
- Buyers (Register (ID and password), How you can buy fish at the auction. fees and charges, rules and forms)
- Expected landings (Catch method, species, grade, volume (number of boxes), download or print out of PDF, Excel file or CSV file)

- Today's sales catalogue (Fishing boat's name or number, catch method, species, grade, volume (number of boxes), download or print out of PDF, Excel file or CSV file)

- Prices (Sales date, fishing vessel, species, grade, volume (number of boxes), maximum prices, average prices, download or print out of PDF, Excel file or CSV file)

- Services (Sorting, grading and weighing, ice supply, clean water supply, fish boxes, packing and shipping purchased fish and fishery products)

- Documents (Invoices, landing statements, etc.)

5 Safety and quality of fish and fishery products

- Quality management

- HACCP system (Videos and photos)

6 Fish resource management

7 Fisheries statistics

- Weekly, monthly and yearly landings

- Download or print out of PDF, Excel file or CSV file

8 News & topics

9 Practical information

- Meteorological and oceanographic information

- Traffic information

10 Contact

5.4 ICT, IoT-utilized sales

5.4.1 Recording, reporting and transmitting information on the catch and trade

Figure 6.1 shows the EU and US system for recording, reporting and transmitting information on the catch and trade of fish and fishery products to ensure fisheries resource management. An auction hall located at a fishing harbour is the first sale point where fish and fishery products received from producers are sold to buyers (processors or distributors), and is the only place (database) where catch and sale information can be accurately recorded.

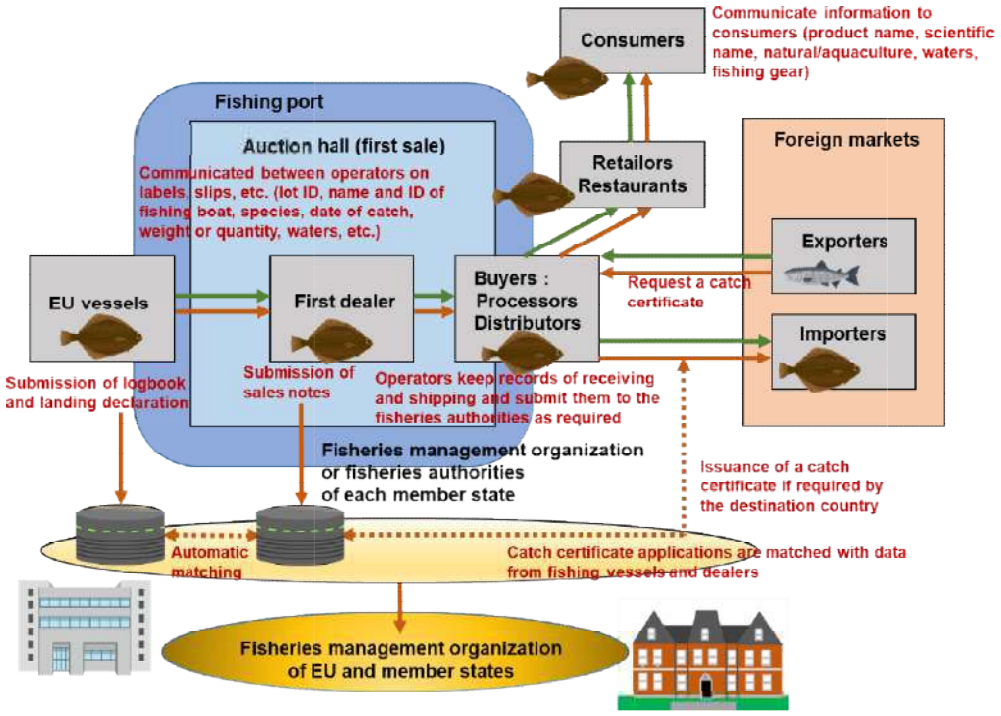


Figure 6.1 EUsystem forrecording,reportingandtransmittinginformation on the catch and trade

Figure 6.2 shows how ICT and IoT are utilized in the EU system. ICT, IoT utilization in sales means not only the electronic auction, but also the entire process of reporting catch information to the fisheries authorities and providing it to the market, landing at the fishing harbour and bringing it into the market, washing, sorting & grading, weighing, auctioning, delivery, shipping, issuing invoices (landing statements) to producers and bills (sales notices) to buyers, and reporting the results of sales (sales notes) to the fisheries authorities (or fisheries management organization).

The key to this computerization is a database in which the information on catch and sales is automatically recorded, through the electronic auction. Documents such as sales notices and the reports such as sales notes can be automated by pulling the necessary information from the database. The database can also facilitate the issuance of catch certificates and the provision of traceability information, which is necessary when exporting fish and fishery products, with a high degree of reliability and speed.

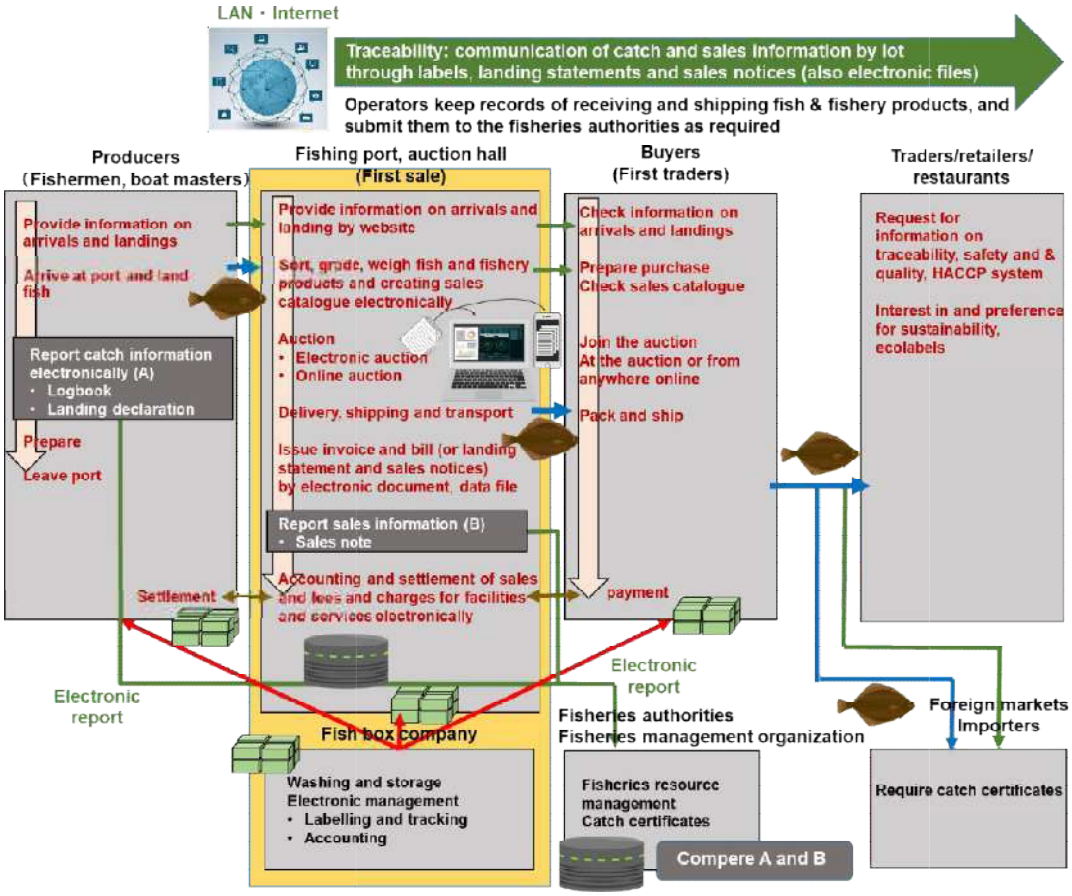


Figure6.2EUsystem utilizingICT,IoT

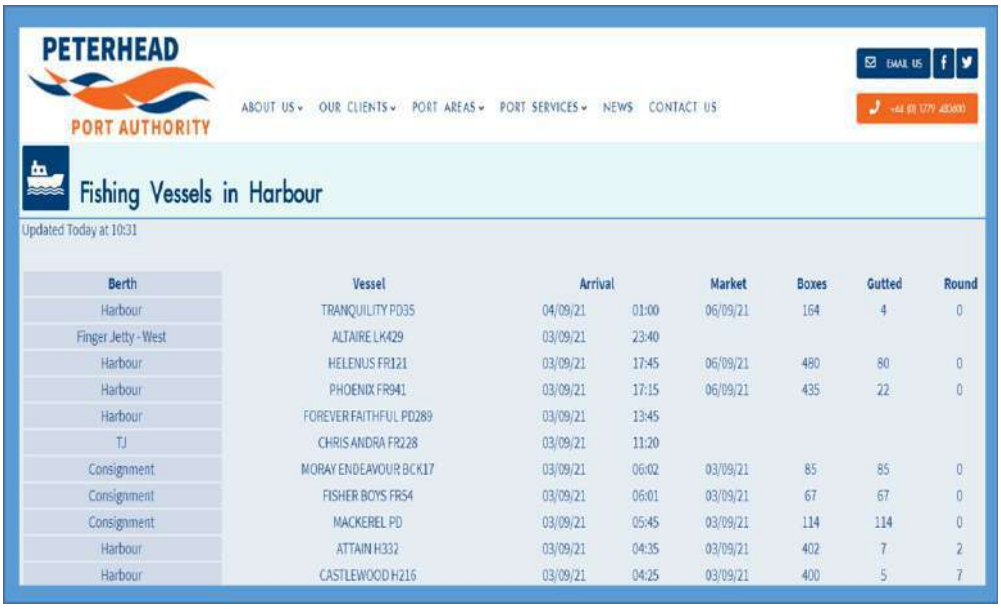
5.5 ICT, IoT utilization according to sales process

5.5.1 Arrival of fishing vessels and landing information

Information on the date and time of arrival of fishing vessels and the landings is transmitted from the fishing vessels to the auction hall via the fishing vessel owner's office by telephone or internet the day before the sale or by the time of the auction. In some cases, reports to the fisheries authorities (or fisheries management organization) are also provided by the fishing vessels to the auction hall via the internet. Small fishing vessels operating day-trip coastal fishing catch a small quantity and variety of fish. So, small fishing vessels are not required to provide landing information to the auction hall. However, when the fishing vessels have catch larger than usual, they provide landing information to the auction hall by mobile phone.

The fishing vessels arrival information includes the fishing vessel's name, the date and time of arrival, the expected date of sale, the species of fish and the number of fish

boxes or the catch. Landing information includes the name of the fishing vessel, species, grade, the number of fish boxes or the catch and also information on the species eligible for ecolabel fishery certification. This information is uploaded to the website, posted in the waiting & resting room for buyers, etc. of the auction hall. Figure 6.3 shows an example of providing arrival of fishing vessels and landing information on the website wet up by the Harbour Authority.



Berth	Vessel	Arrival		Market	Boxes	Gutted	Round
Harbour	TRANQUILITY PD35	04/09/21	01:00	06/09/21	164	4	0
Finger Jetty - West	ALTAIRE LK429	03/09/21	23:40				
Harbour	HELENUS FR121	03/09/21	17:45	06/09/21	480	80	0
Harbour	PHOENIX FR941	03/09/21	17:15	06/09/21	435	22	0
Harbour	FOREVER FAITHFUL PD289	03/09/21	13:45				
TJ	CHRIS ANDRA FR228	03/09/21	11:20				
Consignment	MORAY ENDEAVOUR BCK17	03/09/21	06:02	03/09/21	85	85	0
Consignment	FISHER BOYS FR54	03/09/21	06:01	03/09/21	67	67	0
Consignment	MACKEREL PD	03/09/21	05:45	03/09/21	114	114	0
Harbour	ATTAIN H332	03/09/21	04:35	03/09/21	402	7	2
Harbour	CASTLEWOOD H216	03/09/21	04:25	03/09/21	400	5	7



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LATEST FISH LANDINGS

Vessel	Total Boxes	Cod	Monks	Haddock Lrg/Med	Haddock Sml	Haddock Sml Round	Whiting	Whiting Round	Saithe	Megrim	Squid	Hake	Lemons	Plaice	Witches	Ling	Others
PHOENIX FR941	435	17	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3
				124	206		13		14			53		3			
HELENUS FR121	480	20	0	0	0	0	20	0	0	0	0	0	0	0	0	5	35
				40	270				20			65		5			
TRANQUILITY PD35	164	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
					6	150						1		3			
SHALIMAR PD303	852	110	10	0	0	0	0	110	0	2	0	0	4	0	5	3	30
				65	355	25	25		55			50		3			
FALCON H119	861	89	7	0	0	0	0	110	0	4	0	0	3	0	3	5	55
				80	360	34	30		35			40		6			
VICTORIA MAY SF267V	715	65	130	13	13	15	0	3	281	0	0	12	0	0	0	38	145
EMULATOR SH83	193	111	9	0	0	0	2	0	0	0	0	0	4	0	2	1	11
				4	8				31			1		11			
STEADFAST HOPE BF340	190	15	30	0	0	0	10	55	0	0	0	0	0	0	10	2	3
					45				20								
Totals	3890	427	188	13	13	15	36	278	281	6	0	12	11	0	20	54	282
				313	1248	209	68		175			210		31			

MSC fish are shown in blue or shaded boxes. Vessels are responsible for the declaration.
Responsible Fishing Scheme certified vessels are highlighted in yellow.

Source:https://www.peterheadport.co.uk/

Figure6.3Arrivaloffishingvesselsandlandinginformation,Peterhead,UK

5.5.2 Landing and bringing in the auction hall

On the day before or on the day of the scheduled sale, the fish are removed from the hold in fish boxes using cranes on board or on the quay and brought in the main building of the auction hall on forklifts or trolleys. Floating fish (pelagic fish) are taken directly from the hold to the tanks on the quay or into the main building by fish pumps or nets. The fish boxes and tanks are placed in a cold controlled area soon after landing to ensure freshness.

Figure 6.4 shows the labels on the fish boxes landed at Lerwick and Scalloway. The fish has already been sorted and weighed on board before landing and includes information such as fishing vessel's name, species and weight by fish box.

Figure6.4Labelsattachedtothefishboxeslandedatthequays,Lerwick &scalloway,UK



Label in the fish box | Label attached to the fish box | Landing and bringing into the main building of the auction hall

5.5.3 Sorting, Grading, Weighing fish and creating sales catalogue

5.5.3.1 Sorting and grading

Catch may be sorted, graded and weighed on board (depending on the species, primary treatment such as gutting may be also carried out on board), and a label with their results (fishing vessel's name, catching area, species, grade, weight, etc.) attached to the fish box, as shown in Figure 3.4. The content of the label attached to the fish box is scanned and additional information such as the quality level added from a tablet/PC terminal. Even if fish are weighed in advance, the information on the label may be incorrect or the label may be unclear, and in order to ensure traceability with accurate information, fish are weighed on a sample basis by fishing boat, species and grade for check.

In the case where the catch has not been sorted, graded and weighed on board, the automatic fish species sorting machine may be used for horse mackerel and other species and the automatic fish grading machine may be used for flatfish, flounder, skipjack, salmon, etc.

Figure 6.5 shows the automatic grading machine at Scalloway, UK, and Figure 6.6 shows other examples.



Figure6.5Automaticgradingmachineforflatfish,Scalloway,UK



Grading machine for salmon
Ishinomaki, Japan

Grading machine for ??
Tarragona, Spain

Figure 6.6 Other examples of automatic grading machines

5.5.3.2 Weighing and creating sales catalogue before auction

The fish box with fish in is placed on the weighing terminal and the catch information such as the fishing vessel's name and number, start and end dates of catch, catch area, and fishing method is entered from the panel of the weighing terminal as shown in Figure 6.7. The information such as species, grade in size, condition (fresh, frozen, etc.) and quality level and eco-label certification is also entered. The information is automatically sent to the server at the time of weighing, resulting in printing a label containing the information, which is posted on the side of the fish box or placed in the fish box. It is relatively easy to create a sales catalogue by drawing the necessary data from the server.



Figure 6.7 Weighing terminal, Boulogne-sur-Mer, France

The sales catalogue may be created by entering the information on the labels or slips (small sheets of paper) in the fish box from a tablet/PC terminal as shown in Figure 6.8. As most of the necessary information about the fish is defaulted, has to be actually entered from the weighing panel, or tablet/PC terminal. Sales catalogues are printed out and distributed to buyers, or pre-registered buyers can log in to the website to view, print out or download (as a PDF file).

Figure 6.9 shows the forklift with a tablet-mounted weighing scale and fish tanks with IC tags at Ofunato, Japan. RFID tags are attached to the fish tanks, one at the front and the other at the back of the tank. The weighing results by using a forklift weighing scale are linked to the tank number read from the RFID tag and sent to the server for recording. A tank of seawater or ice is pre-weighed and then the tank is weighed with the fish in it. By subtracting the weight of the former from that of the latter, the net weight of the fish is obtained.



Figure 6.8 Creating sales catalogue, Skagen, Denmark

Figure 6.9 shows other examples of weighing scales with ICT, IoT utilized.



Figure 6.9 Forklift with tablet-mounted weighing scale and fish tanks with IC tags, Ofunato, Japan

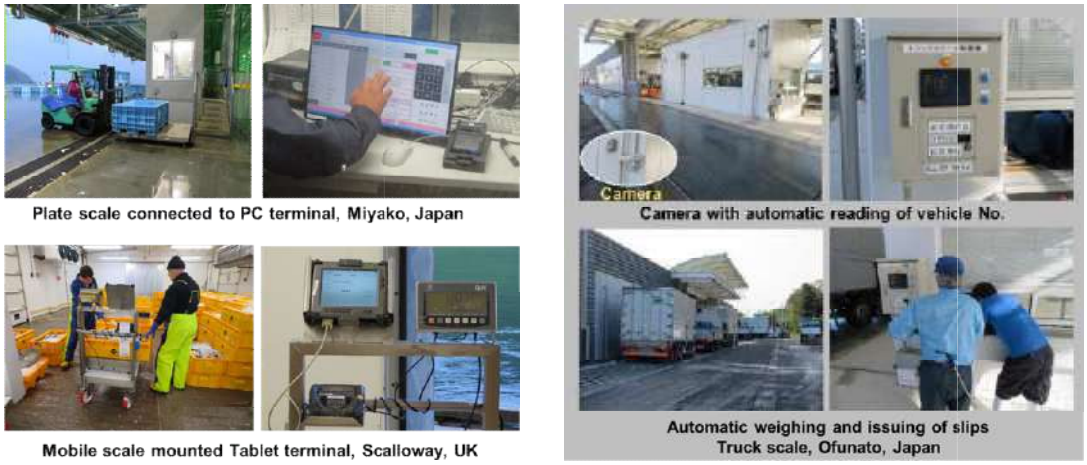


Figure 6.10 Other examples of weighing scales with ICT, IoT utilized

5.5.3.3 Weighing and creating sales catalogue in the course of auction

Fish boxes with fish in by fishing vessel are placed on the conveyor belt moving to the auction area. When the fish box reaches the scale on the conveyor belt, it is automatically weighed. Figure 6.11 shows the weighing and creating a sales catalogue at Lorient-Keroman, France. Market personnel enter the information about the fish other than the weight, resulting in creating a sales catalogue. The information for sale is shown on the screen or electronic display in the auction hall.



Figure 6.11 Weighing and creating a sales catalogue, Lorient-Koroman, France

Figure 6.12 shows the weighing and creating a sales catalogue while fish boxes with fish in are moving on the conveyer belt at Civitanova, Italy. In the cabin near the auctioneer, information such as the fishing vessel's name and number, catch area,

species, grade in size, condition and quality level other than the weight are entered from a PC terminal, and a sales catalogue is created. The video footage of the fish and information for sale are shown on the screen in the auction hall. The auctioneer announces the quality of the fish to the cabin and the auction for each sales lot begins.



Figure6.12 weighingandcreating asalescatalogue while the products aremovingon the conveyor belt, Civitanova, Italy

5.5.4 **Auction**

5.5.4.1 History of electronic auction

Electronic auction was first introduced in the late 1980s to save labour and time, improve efficiency and avoid manual errors. In the 1990s, PCs became more sophisticated and network connections, such as LANs, were used for more sophisticated work. The opening of the Internet, developed in the United States, to the private sector accelerated informatization, and from the mid-1990s the Internet spread rapidly throughout the world, enabling the instantaneous and interactive exchange of a large amount of information. Moreover, the development and widespread use of mobile phones has made it possible to exchange information from any location. This has led to the introduction of online auctions, where buyers from all over the country and the rest of the world can participate via the internet. The number of markets conducting online auctions has increased since 2000 due to the widespread availability of broadband and

also the increasing use of smartphones in the 2010s. A web-based transaction system has also been launched.

As buyers may participate in the auction from all over the world, it is a prerequisite that a quality assurance system for fish and a delivery system from the auction hall are in place. For the quality assurance system, there are EU quality criteria and more detailed criteria set up by Scandinavia and other exporting countries. As for the delivery system, it must be punctual and ensure a cold chain up to the buyer's designated destination. The Nordic and Scottish markets, such as Norway, Denmark, the Faroe Islands and Shetland (UK), meet these requirements, and rely heavily on online auctions.

5.5.4.2 Classification of auctions in terms of the utilization of ICT, IoT

Auction is a very old tradition of selling or buying of products and services which allows the highest bidder to get hold of them. According to the extent to which ICT, IoT is used for computerization, automation and systematization of the auctions, they are classified as follows:

1 Conventional auction/manual auction (local auction/physical attendance auction);

The auctioneer starts the auction with a shout in front of the fish. In the case of an ascending auction, the buyer voices the price or indicates it with his finger. In the case of a descending auction, the auctioneer shall state the price and the buyer shall respond to it by voicing or gesturing.

2 Electronic auction (local auction/physical attendance auction);

Computers have been introduced to automate and systematize the auctioneering process. The information about the fish is displayed on an "auction clock" - electronic board or screen - , and the buyers join the auction while looking at the fish. The buyer presses a key on a remote control or pad at the price he wants to buy. A computer network (LAN), has been set up, with wireless or wired connections between server, computers, remote controls and terminals. The information converted into database as the auction progresses would contribute to the automation and efficiency of the work that follows the auction, such as the issuance of invoices and sales notices.

3 Electronic auction (Online auction/internet auction/remote auction);

By connecting the auction hall’s computer network (LAN) to the internet, it is possible to participate in the auction in real time from anywhere in the world, without having to

go to the auction hall (not physical attendance), as far as buyers have PCs, tablets or smartphones with an internet connection. It is also possible to participate in more than one auction or market simultaneously. This would lead to the more new buyers.

4 Electronic auction at the virtual market (first-price sealed-bid auction online); and

The virtual market is built in cyberspace and first-price sealed-bid auctions online take place. In the virtual market, the market in cyberspace, the producers (fishing vessels) at sea and buyers (processors) around the world are linked via the internet, and once each auction is completed, the fishing vessel goes directly from the fishing grounds to the processing plant designated by the buyer. In addition to the benefits of electronic auction, the separation of sales and logistics saves labor and time, and contributes to keep the catch fresh. On the other hand, it is noted that it is difficult to find a link with the function of fishing harbours.

5 Web transaction/negotiated transaction.

Via the internet, sellers and buyers negotiate with each other on the web and decide on items, prices and quantities in advance or at the auction.

With the utilization of ICT, IoT, auctions are held in different locations - display area, auction area, auction room, anywhere inside and outside the auction hall, virtual market.

5.5.5 Delivery, dispatch and transport

The fish auctioned off are checked by the market personnel for the contents of the labels in or on the fish boxes and are placed together in the designated area for each buyer, who has purchased them, where the fish are delivered from the market to the buyers. Then the fish are either dispatched from the auction hall by truck, carts or forklift as they are or, after packed.

The label contains catch and sales information that identifies the fish by lot, which is also necessary information to ensure traceability. Traceability information can be obtained in a variety of formats (PDF, Excel and CSV files) by reading it with a smartphone or other device from the barcode or QR code on the label on the fish box.

Figure 6.13 and 6.14 show the labels and the information contained therein in or on the fish boxes at Giulianova, Italy, and at Gilleleje, Denmark respectively.

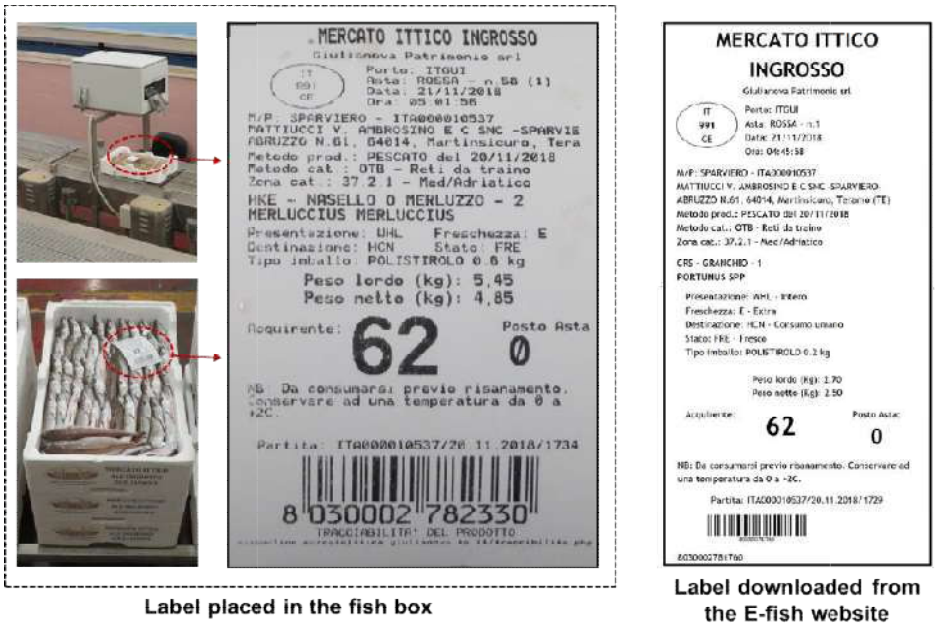


Figure 3.13 Delivery of fish with a label in the fish box, Giulianova, Italy

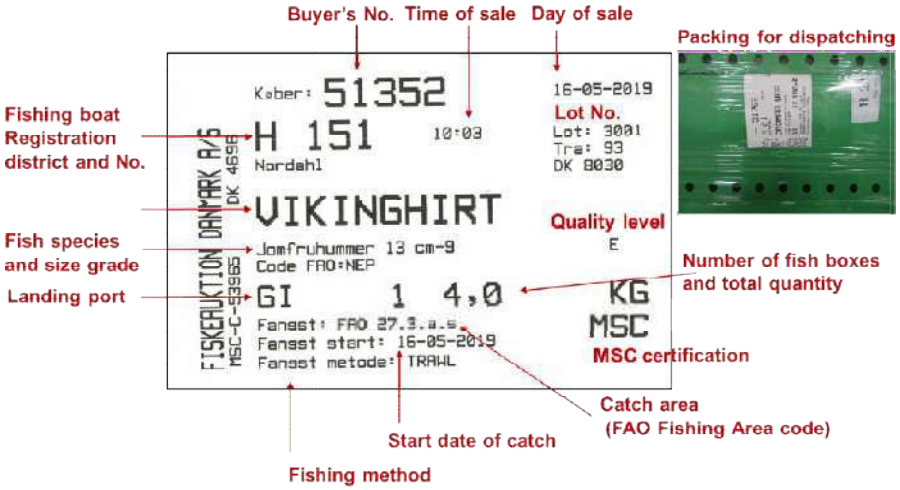


Figure 6.14 Delivery of fish fishery products with a label in the box, Gilleleje, Denmark

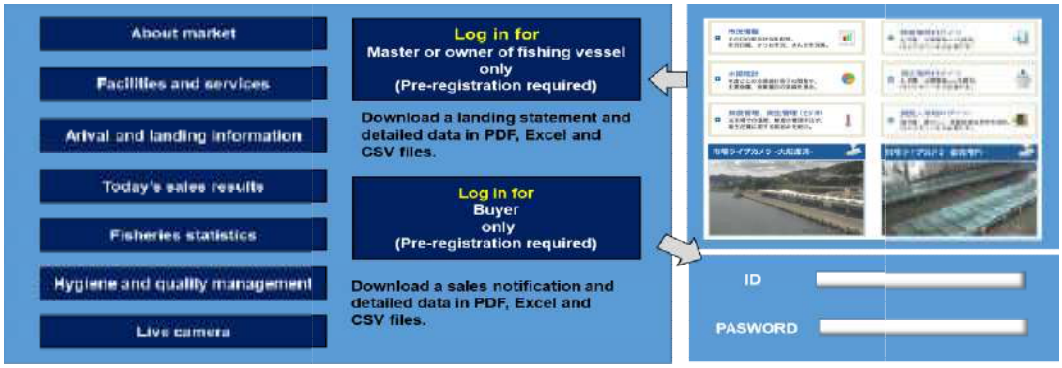
5.5.6 Issuing landing statements and sales notices

Information on the catch and sale is recorded electronically on the auction hall's server through the sales process. After the day's sales, landing statements to producers and sales notices (invoices) to buyers are automatically created by drawing necessary information from the server. A landing statement is a vessel-by-vessel list of which fish and have been purchased and by whom. A sales notice (invoice) is a bill for the fish purchased by the buyer.

Fishing vessel's owners or buyers receive these documents manually or electronically as follows:

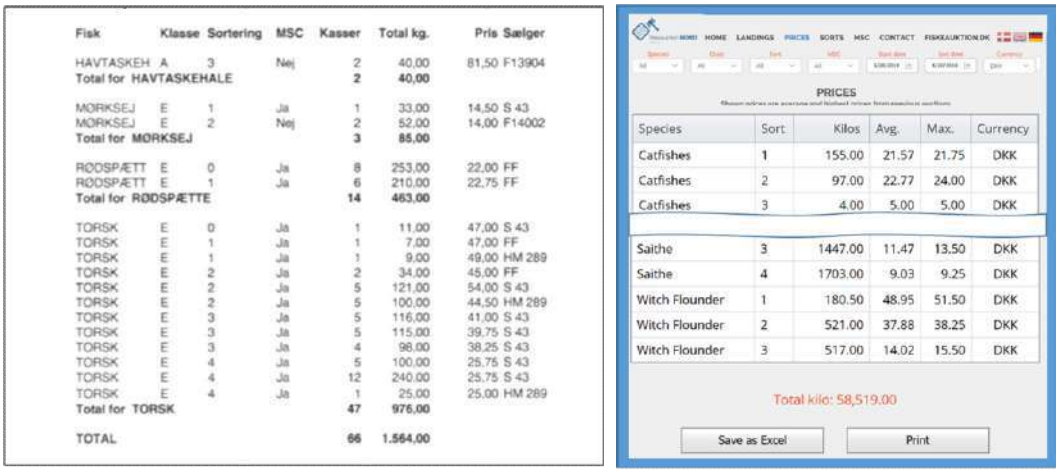
- The market personnel print out the documents on paper and post them in the boxes of the buyers and the fishing vessel's owners respectively;
- The personnel send the PDF file or other type of file to the buyers and the fishing vessel's owners by email; and
- Buyers and fishing vessel's owners log in the dedicated website to view and download them and detailed data in PDF, Excel and CSV files.

The day's sales results (fish species, grades, quality levels, prices, etc.) are uploaded on the website, soon after the auction.The landing statements and sales notices contain catch and sales information that identifies fish, and these documents can be recorded electronically by the vessel owners, buyers and market personnel to ensure traceability. Statistical information on the volume and value of sales by fish species and fishing method is reported monthly to the municipal and state statistical authorities and to the fisheries authorities. The accounting of commissions, charges, taxes associated with sales and other services is also computerized.



http://www.ofunato-fm.com

Figure 6.15 Website for download of landing statements and sales notices, Ofuna, Japan



Fisk	Klasse	Sortering	MSC	Kasser	Total kg.	Pris Sælger
HAVTASKEH	A	3	Nej	2	40,00	81,50 F13904
Total for HAVTASKEHALE				2	40,00	
MØRKSEJ	E	1	Ja	1	33,00	14,50 S 43
MØRKSEJ	E	2	Nej	2	52,00	14,00 F14002
Total for MØRKSEJ				3	85,00	
RØDSPÆTT	E	0	Ja	8	253,00	22,00 FF
RØDSPÆTT	E	1	Ja	6	210,00	22,75 FF
Total for RØDSPÆTTE				14	463,00	
TORSK	E	0	Ja	1	11,00	47,00 S 43
TORSK	E	1	Ja	1	7,00	47,00 FF
TORSK	E	1	Ja	1	9,00	49,00 HM 289
TORSK	E	2	Ja	2	34,00	45,00 FF
TORSK	E	2	Ja	5	121,00	54,00 S 43
TORSK	E	2	Ja	5	100,00	44,50 HM 289
TORSK	E	3	Ja	5	116,00	41,00 S 43
TORSK	E	3	Ja	5	115,00	39,75 S 43
TORSK	E	3	Ja	4	98,00	38,25 S 43
TORSK	E	4	Ja	5	100,00	25,75 S 43
TORSK	E	4	Ja	12	240,00	25,75 S 43
TORSK	E	4	Ja	1	25,00	25,00 HM 289
Total for TORSK				47	976,00	
TOTAL				66	1.564,00	

List of purchased fish and fishery products Sales result

http://www.hirfiskauk.dk/Prices

Figure 6.16 Purchase list printed out and sales results on the website, Hirtshals, Denmark

Figure 6.15 shows the website where landing statements, sales notices and their detailed data in PDF, Excel and CSV files can be downloaded at Ofuna, Japan. Today's sales results, and fisheries statistics also be downloaded. Within an hour after the end of the day's sale, landing statements and sales notices are issued, followed by the sales results uploaded.

Figure 6.16 shows the purchase list printed out and sales results at Hirtshals, Denmark. There is a printer in the auction hall, and when a buyer puts his chip on the sensor, a list of fish purchased up until now is printed out.

5.6 Service charges

To ensure safety and quality of fish and safety and efficiency of operations for sale, clean seawater, tap water, ice and electricity are consumed, and machine and equipment such as electric forklifts, carts, and grading machine are used. Users shall be properly charged, in accordance with the rules. The more electronically the information on users' charges are recorded in real time, and invoices and bills are issued soon, the more efficient operations are carried out and the more labor and time are saved.

Figure 6.17 shows the management system for forklift use and its electricity charges at Ofuna, Japan. Each time a user charges a forklift, information on its use is automatically

recorded on a server in the central computer room. Users other than market personnel are charged according to their use of the forklift and the electricity.

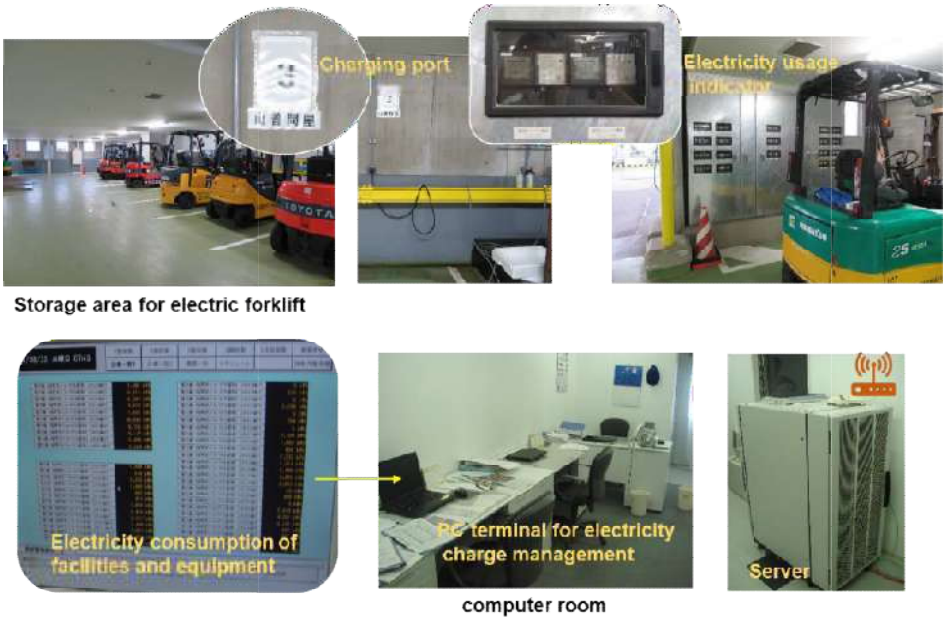


Fig. 6.17 Management system for forklift use and its electricity charges, Ofuna, Japan

5.7 HACCP system facilitated by ICT

At the auction hall where fish and fishery products are sold, the HACCP system is applied for food safety. Specifically, the auction hall is required to maintain and improve its structures & facilities, and machinery & equipment as well as provide guidance to users and maintain records of the measures taken to control hazards. As a part of the HACCP system, the person responsible draws up a management manual, which will be followed by the relevant personnel who will check the status of management at the control points and record the results in a record book (on paper generally). The person responsible finally confirms the results of the checks made by the personnel and keeps the record book.

Considering the limited number of personnel and their time, it is necessary to have a computerized system that can automatically manage the hygiene of people and vehicles entering and leaving the auction hall and fishing harbour, and easily record the results of hygiene management and provide them quickly upon request. The utilization of ICT in the control of the entry and exit of people and vehicles, and in recording the check results at the control points, can save personnel and time for the HACCP management.

5.7.1 Automatic entry and exit management system

The automatic entry and exit management system for vehicles automatically authenticates the vehicle at the gate to ensure that it is a pre-registered vehicle, and also works in conjunction with the car wash facilities and gate operation to automatically control the hygiene and safety of vehicles entering the landing and clearance area. The vehicle can be identified either by contact, using an ID card, or non- contact, using an automatic reading of the vehicle number. The system eliminates the need of assigning the personnel to control whether vehicles are entering the auction hall properly, and ensures that the auction-related people (market personnel, buyers, distributors and transporters, etc.) comply with hygiene management for vehicle entry.

Figure 6.18 shows the example at Ishinomaki, Japan. Vehicle entry and exit facilities using contactless transit cards have been installed at the gate of the access road to the quay, allowing only authorised vehicles to enter. When a vehicle enters or exits the quay, the number on the vehicle's number plate is read at the gate, and if the vehicle is not registered, it is either not allowed to enter or is checked by the market personnel using a live camera, and if there is no problem, it is registered before being allowed to enter. There is also a car wash area at the entrance gate after passing through the gate, where water is sprayed in conjunction with the gate to wash tyres. At this time, video footage of the tyre washing process is recorded.

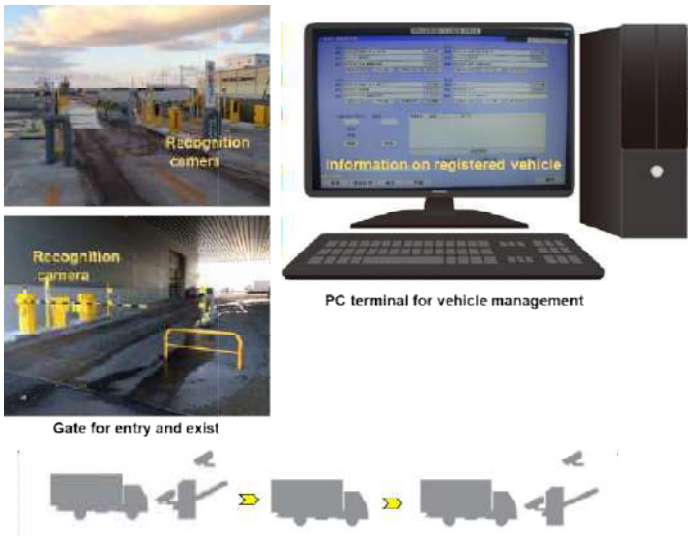


Figure 6.18 Automatic entry and exit management system for vehicles, Ishinomaki, Japan

The automatic entry and exit management system for people confirms that the person has been registered in advance and automatically carries out hygiene and safety control in the workplace by opening the entrance door to the workplace in conjunction with hand washing, hand disinfection, changing into boots and boot washing. There are two methods of automatic authentication: contact method using ID cards and non-contact method using automatic reading of ID cards.

Figure 6.19 shows the example at Ishinomaki, Japan. All those entering the auction hall are required to wash their hands, disinfect their hands and wash their boots in the access control room, and only those who are authorized by ID authentication are allowed to enter. The washing of hands and boots is recorded on video.



Figure 6.19 Automatic entry and exit management system for people, Ishinomaki, Japan

5.7.2 **Camera system**

By placing cameras at various locations in the fishing harbour, including inside and outside the auction hall, the use of the fishing harbour such as the arrival, landing, anchoring and preparation for departure of fishing boats, the sales situation in the market, as well as the hygiene management status can be centrally monitored, recorded in real time from a PC terminal in the office.

Figure 6.20 shows the centralized surveillance camera system at Akkeshi, Japan. Twenty-three cameras are installed in the fishing harbour, and PC terminals in the administration office allows the harbour and market personnel to view video footage in real time, as well as video footage automatically recorded on a server for the past two weeks. These images are used to check the entry of suspicious persons and non-authorized vehicles.

Figure 6.21 shows CCTV installed along the auction lean, Tarragona, Spain. Although there are differences in system structure and function between CCTV and surveillance cameras, both are installed and centrally controlled to monitor harbours and check the safety of operations in markets and other areas.



Figure 6.20 Surveillance cameras installed throughout the fishing port, Akkeshi, Japan

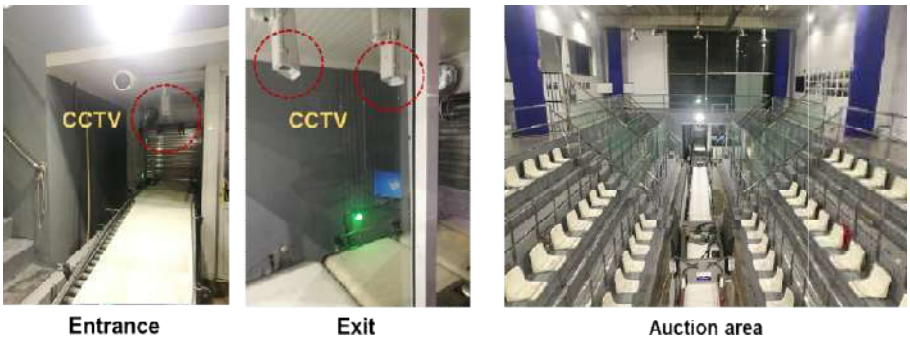


Figure 6.21 CCTV instolled along the auction lean, Tarragona, Spain

Figure 6.21 shows CCTV installed along the auction lean, Tarragona, Spain. Although there are differences in system structure and function between CCTV and surveillance cameras, both are installed and centrally controlled to monitor harbour and check the safety of operations in markets and other areas.

5.7.3 Electronic recording for HACCP management

In accordance with the HACCP system, the relevant personnel check the hygiene management status at the control points and enters the results on the spot from the tablet terminal and records them on the server. The recorded information can be retrieved from the server by the person responsible for the hygiene management, hygiene controller, at any time, from anywhere, using a tablet or PC terminal, for final verification and storage.

5.8 Electronic information for traceability

Figure 6.22 shows a sales plate with traceability information, Spain. In response to growing consumer interest, retailers are selling fish with plates containing not only the price but also information on where and how the fish was caught, under the initiative of the Catalan Consumer Agency.



Figure 6.22 Sales plate with traceability information, Spain

The EU is described here as an example of how the necessary information is created, recorded and transmitted electronically in order to ensure traceability.

Lot-based traceability is the basic principle, and traceability information is transmitted on labels or vouchers by stating the lot ID, name and ID of the fishing vessel, species,

catch date, weight or quantity, and catch area, etc. as shown in Figure 6.22. This also applies to aquaculture products. In the case of lot consolidation or lot split, the original lot ID corresponding to the new lot should be recorded.

Traceability information on the fishery products is recorded and stored electronically to the market's database through the sales process. The labels, landing statements, sales notices and other documents are completed and issued electronically. Since the auction hall is the starting point for traceability, the ICT and IoT - based sales process at the first sale of the fishing harbour contributes greatly to the establishment of precise and efficient traceability information towards the end consumers.

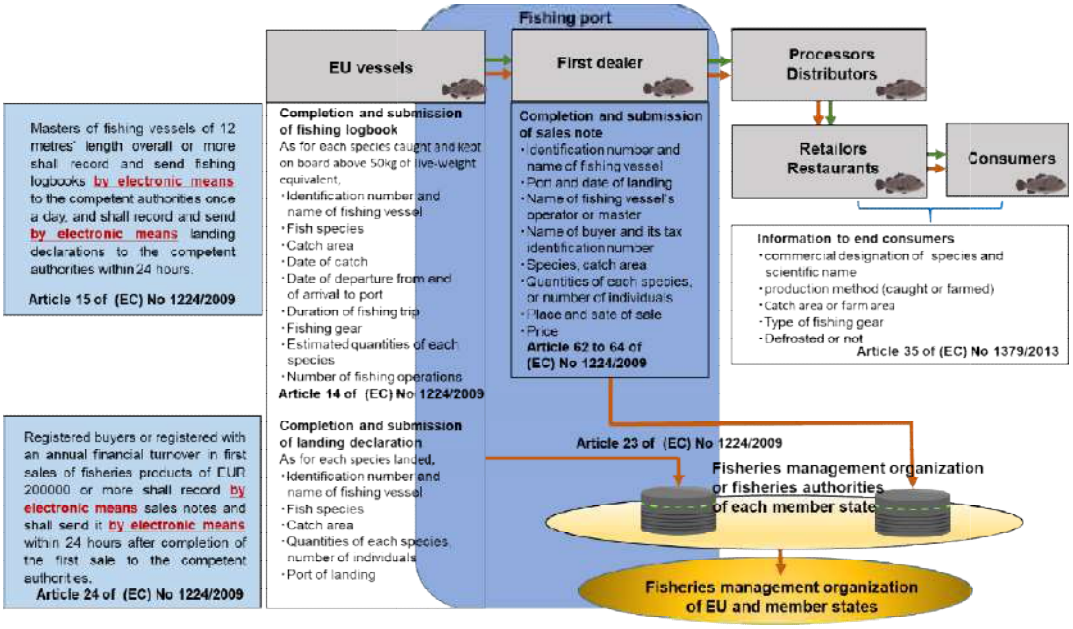


Figure 6.22 Recording, transmitting and displaying information on fish (fishery products)

6. PROJECT COMPONENTS

6.1 Construction of Breakwaters

6.1.1 TheAjanur fisheries village is spread over five wards of Ajanur Gram Panchayat and the construction of this breakwater will be a great relief for the fishermen families inAjanur as protection against high wave actions, adverse flow conditions near the entrance channel and wave breaking at low tides while manoeuvring their trawlers /boats.

6.1.2 This estimate is prepared for the construction of Breakwater at Ajanur, ChithariKadappuram. The major components are Northern Breakwater of 1150 m length, Southern breakwater of length (425 m).

6.1.3 5 kg to 20 kg category stones of approved quality is proposed for the filter layer. Core of the breakwater is proposed to be constructed using 20 to 50 kg and 20-100kg category stones. Stones of 50-100kg,100-200kg, 200-300kg,500kg-1T category are proposed for secondary armour,2 to 3T and 500kg-1T category stones for berm or scour protection and2T, 6T tetrapods at sea side at trunk portion and 8T tetrapods at round head is proposed. At the leeward side 500 kg-1 T and 1T-2T category stones are proposed category stones for the primary armour layer. Crest width of 6.0 m at trunk and9.0 m at head is provided.

6.1.4 Total cost for this component comes to**Rs.121,60,00,000**including 18 % GST.

6.2 Construction of River training work and dredgingnear the river training area

6.2.1 A river training work of Chithari River in the form of a beak water of length 432 m is proposed. River training work is proposed considering two major coastal processes: control of shitting and closing of Chittari River mouth due to sedimentation and southward littoral drift and littoral zone consideration.

6.2.2 5 kg to 20 kg category stones of approved quality is proposed for the filter layer. Core of the breakwater is proposed to be constructed using 20 to 50 kg and 20-100kg category stones. Stones of 50-100 kg,100-200 kg, 200-300 kg,500 kg-1 T category are proposed for secondary armour, 2 to 3 T and 500 kg-1 T category stones for berm or scour protection and 2T, 6T tetrapods at sea side at trunk portion and 8T tetrapods at round head is proposed. At the leeward side 500 kg-1T and 1T-2T category stones are proposed category stones for the primary

armour layer. Crest width of 6.0 m at trunk and 9.0 m at head is provided.

6.2.3 Dredging is proposed in between the north break water and river training work at the mouth of River Chithari on an average 100 m width and 350 m length. It is proposed to dredge the area to a level of -3.0m.

6.2.4 Total cost for this component comes to**Rs. 32,60,00,000**including 18 % GST.

6.3 Dredging and Construction of Reclamation Bund

6.3.1 Dredging is proposed in the basin channel having average width 130 m and length 510 m It is proposed to dredge the area to a level of -3.0m.

6.3.2 The reclamation bund is proposed to be constructed along the basin for a length of 400 m. The bund shall have geotextile (120 grams per sqm membrane) in two layers including joints by stitching for bund along the basin dry rubble masonry with good quality blasted rubble for protection wall along the basin and with specified grade of reinforced cement concrete 1:1.5:3 is proposed for protection wall.Beneath the geotextile layer a layer of 6 mm stones, 20 mm stones and a core of 10 to 20 kg stones are provided respectively. The reclamation bund along the basin has a base width of 400 cm and top width of 115.9 cm, and has a height of 550cm. Provision for 180 RCC guard pillars is given.

6.3.3 Total cost for this component comes to **Rs.6,24,00,000 including** 18 % GST.

6.4 Construction of Wharf and Auction hall

6.4.1 A 120 m long wharf with a width of 6.60 m for 60 m length and 5.00 m width for remaining 60 m length is provided for landing, berthing, and repair of fishing vessels. The beams and deck slab of wharf is proposed to be constructed of M-30 design mix using HCR reinforcement andM-35 bored cast-in-situ concrete piles of 750 mm diameter and 27.35m length is proposed as foundation for wharf. Facia wall of 1.5m depth is also provided.Wearing coat on deck slab is proposed using cement concrete 1:1.5:3 using 15mm broken stone for wharf.

6.4.2 Auction hall is ofsize 60 x 15 m is proposed on the rear side of the quay wall along landing area.The auction hall shall have RCC pile foundation with cast in situ concrete piles of M-35 grade, beams and slabs at floor level is made of M-30 design mix and with TMT bar of grade Fe-500D or more. 1.2 m long. Provision for column of size 40x 40 cm along with sloped roof of thickness 17.5 cm

supported on longitudinal and cross beams of grad M 25 are provided. Provision for centering and shuttering, all cement plastering of mix 1:3, first quality ceramic glazed wall tiles for auction hall columns, industrial floor tiles,all painting works of required shade etc. also included in this proposal.

6.4.3 Total cost for this component comes to **Rs. 5,91,00,000** incl. 18 % GST.

6.5 Construction of Canteen, Rest shed, Locker room and Gear shed

6.5.1 Atwo-storied building of overall size 45 m x 10 m is proposed to accommodate net mending shed, shops and locker room in ground floor and canteen and rest rooms in the first floor. Net mending shed of size 23.2 m x 10 m is proposed in the ground floor. 5 locker rooms and 5 shop rooms of size 3.10m x 3.50 m size is proposed in the ground floor. A canteen of size 23.2 m x 10 m is proposed in the first floor along with 10 rest rooms of size 3.10m x 3.40 m. Head room of height 300cm is proposed.

6.5.2 The building shall have concrete isolatedcolumn footingover coconut piling work and rubble packing.PCC bed of nominal mix 1:4:8 is to be provided for walls, beams, floors etc. RCC belt is provided for long and cross walls. Random rubble masonry with hard stone is proposed upto plinth level and superstructure shall be of solid block masonry using pre cast solid blocks. RCC of nominal mix 1:1.5:3 for footing and plinth beam. RCC of nominal mix 1:1.5:3 for columns.RCC of nominal mix 1:1.5:3 for beams, roofs, lintel, and sunshade works, in ground and first floor.Fe 500-D and above grades steel is used in RCC works upto plinth level and upto floor five level. Rolling shutters of approved make is proposed for all rooms of first floor and stair room. Teak wood work is proposed forframes of doors and windows. Vitrified floor tiles in different sizes is proposed for flooring works in shop room, locker room, veranda, canteen, rooms and textured industrial 12mm thick floor tiles offirst qualityis proposed for flooring works in net mending shed. Provisions for centering and shuttering,plastering works, all painting works is also included in this proposal.

6.5.3 Total cost for this component comes to **Rs. 2,49,00,000**incl. 18 % GST.

6.6 Construction of Compound Wall and Side Protection Works

6.6.1 The compound wall is proposed to be constructed of laterite masonry with neatly dressed laterite stone of size 30x20x20cm. RR masonry of hard stone is proposed

for foundation. The side protection works shall have foundation with coconut piling workwith 30 cm thick and 80 cm wide dry rubble masonry above it.Superstructure shall be of gabion structure with mechanically woven double twisted hexagonal shaped wire mesh gabion boxes along with geo-textile filter between pitching and embankment slopes, to prevent escape of the embankment material through the voids of the stone pitching.

6.6.2 Nominal mix CC-1:3:6 is proposed uptoplinth level and CC-1:2:4 above plinth level for compound wall and as belt over protection work along with guard pillar.TMT bars of grade 500-D and above provided as steel reinforcement for works upto plinth level. Provision for excavation, 12 mm cement plastering, water thinnable cement primer and finishing walls with water proofing cement paint of required shade are also included in this proposal.

6.6.3 Total cost for this component comes to **Rs.6,14,00,000**including 18 % GST.

6.7 Gate and Gate House

6.7.1 To provide security to the harbour area and to facilitate toll collection it is proposed to construct a gatehouse. The gate house is proposed to accommodate toll booth and ATM counter of size 2.4 x2.4 m each. The gate is supported by two main pillars (0.9x0.3m) and the top portion is decorated by providing pergola which is made up of four long beams and five cross beams. Also the pergolas are covered by UV stabilised fibre glass reinforced plastic sheet for protection against harsh sun rays. The main gate of length 7m and two wicket gates of 0.9mon either side in steel are also proposed. Both the toll booth and ATM counter is provided with sloped roof. The column footing is proposed for main pillars.

6.7.2 PCC concrete of nominal mix 1:4:8 is proposed for works upto plinth level, dry stone packing with good quality blasted rubble is provided under foundation for pillars, walls and steps. RR masonry with hard stones is used in foundation and plinth. Solid block masonry using pre cast solid blocks of size 30x20x20 cm are to be used for gate house walls upto floor two level with 1:6 CM. RCC M30 mix is proposed for all components above plinth level and for column footing of gate house.TMT bars of grade Fe 500D or more used as steel reinforcement for R.C.C works for columns, lintel, roof slab and pergolas

6.7.3 Total cost for this component comes to **Rs.1,80,00,00**including 18 % GST

6.8 Construction of Internal Road, Parking Area and Drainage facility

6.8.1 A 4 m two-way internal road system is proposed to accommodate various type of vehicle entering and leaving the fishery harbour. The internal road is proposed to be made of MSS type A Bitumen S-65.Well graded GSB and WMM layer of 15 cm thickness is proposed over well compacted original surface. Prime coat, tack coat and Mix Seal Surfacing of total thickness 20 mm, 4 m wide and 370 m long of required quality is applied on main road. 30cm wide concrete kerb of nominal mix 1:3:6 is provided for the main road. Laterite boulder masonry with hard departmental stone is proposed for construction of boundary wall of main road.Granular Sub-base with Well Graded Material of 23 m x 42 m for parking area and 4 m wide for main road with 15 cm thickness for both is provided. TMT bars are provided as steel reinforcement in foundation.

6.8.2 Total area of4320 sqm is proposed for parking. The proposed parking area is to be constructed with PCC and RCCM25 of thickness 10 cm and 15 cm respectively with side drains for drainage.A nominal mix CC of mix 1:3:6 for parking area, drainage bed and side walls, and median kerb of the main road is to be provided. The drain is proposed to be made with concrete PCC bed, side walls, cover slabsand 5 cm thick levelling course. Guard stone of 15 cm height is proposed on the side of drainage and parking areaat 2m centre to centre.

6.8.3 Total cost for this component comes to **Rs.2,82,00,000**including 18 % GST.

6.9 Toilet Block

6.9.1 Toilet block includes 4 w/c, counter room cum cloak room, courtyard, bath area and wash area. RR masonry is proposed in foundation with 0.15m thick PCC bed. Cement concrete flooring is to be provided. PCC bed of nominal mix is proposed for walls, beams, floors etc. RCC belt for long and cross walls is proposed.M30 grade RCC is proposed for lintels, beams, sunshade, staircase and roof. The building shall have concrete foundation, Random rubble masonry with hard stone upto plinth level and superstructure shall be of laterite masonry. Brick masonry manhole with RCC top and foundation is proposed.RCC roof slab of M30 mix is proposed.

6.9.2 Total cost for this component comes to**Rs. 25,00,000**including 18 % GST

6.10 Approach Road

6.10.1 The proposed road work involves 950m length with 5.5m in width. There exists a partially damaged road having average width of 4m. The road starts from KanhangadKadappuram road junction and ends at proposed Fishing Harbour. This is the only one approach road to the fishing harbour, hence this road is also proposed as BM and BC road. For the entire stretches, black topping is proposed after filling base course of 15 cm thick WMM. The sub base is prepared by compacting the original ground supporting the embankment. Black topping work includes prime coat, tack coat, 5 cm thick BM and 3cm thick BC.Provisions for loosening and compacting, clearing grass, shifting of utilities and land acquisition are included in the estimate.

6.10.2 Total cost for this component comes to**Rs. 1,38,00,000**including 18 % GST

6.11 Work shop building

6.11.1 This9.8m x 9.8m building which includes contains office room, shop, an electrical workshop, a mechanical workshop, a crane facility and a workspace is proposed. 0.15m thick and 2m wide PCC bed of 1:4:8 mix is proposed for wall and column foundations. Random rubble masonry with hard stone shall be used in wall foundation and plinth. DR packing under foundation with good quality blasted rubble is provided. TMT bars of grade Fe-500D or above is proposed for RCC works upto Plinth level. Plinth beam of 0.45m thickness is proposed. Superstructure shall be constructed of laterite masonry with neatly dressed laterite stone of size 40x20x15cm. RCC belt for long and cross walls, RCC for column and its footing and M30 RCC for lintel, roof slab, sunshade, stair, ground and first floor beams is proposed to be constructed.

6.11.2 Total amount of estimate comes to **Rs. 46,80,000**including 18 % GST.

6.12 Construction of office room cum harbour surveillance camera room

6.12.1 A twostorey building is proposed for office and harbour surveillance camera room having a plinth area of 299.2 m2. Ground floor contains office room, store room, rest room, 3 toilet, porch, entrance, stair room, and an open area for cabins. First floor contains an additional store room. It also includes provisions for a septic tank and soak pit. PCC bed of nominal mix is proposed for wall and

column foundations. Random rubble masonry with hard stone shall be used inwall foundation. Superstructure shall be constructed of laterite masonry with neatly dressed laterite stone of size 40x20x15cm. RCC belt for long and cross walls, RCC for column and its footing and RCC for lintel, roof slab, sunshade,stair, ground and first floor beams is proposed to be constructed with concrete of specified grades. Plastering shall be 12 mm cement plaster of mix:1:4 and 1:3 for ceiling and shall be finished with approved paints. Doors, windows andventilators shall be made of Aluminium. Glass panes shall be provided at the entrance, stair room and for office room for more provision of natural light.

6.12.2 Total amount of estimate comes to Rs. **89,00,000**including 18 % GST

6.13 Water supply arrangements in the harbour

6.13.1 Construction of a new O.H. RCC water tank and Sump for the Ajanur fishing harbour is planned for water supply having a capacity of 100000 litres. It has 60 cm diameter bored cast in situ pile foundation using RCC M 35 mix, lying below a 15 mm thick PCC layer of 1:4:8, a 75 cm thick M 30 RCC layer and 60 cm pedestal below GL successively. RCC columns of size 40X40 cm are provided and RCC water tank using M 30 mix at top in a frame supported by columns,beams and haunches. The beams are in three levels and are also proposed under the tank slab. An RCC cover slab is also proposed. Laterite masonry with neatly dressed laterite stones of size40x20x15 cm size is proposed for superstructure above plinth level upto floor 2 level. Steel ladders are proposed to provide access to the top for cleaning and maintenance functions. Plastering and suitable painting are also proposed.Provisions for distribution lines are also included. Masonry chamber as manhole is proposed. The construction of Pump House at bottom of the RCC tank is planned.

6.13.2 An RCC sump of 50000 litres capacity near the existing water tank is planned. The foundation of the sump is proposed over a dry rubble packing of 45 cm thickness. 15cm thick PCC 1:4:8 is proposed above it. It has an RCC bed slab of M30 grade. The base slab, 20 cm thickside wall and 15 cm thickcovering slab is proposed. Laying of pipe lines for pumping and distribution is planned. Two gates with GI tubes and painting its surface with epoxy painting is planned. Necessary pump set and electrification will be done.

6.13.3 Total amount of estimate comes to Rs. **1,89,00,000**including 18 % GST

6.14 Construction of Wharf for Berthing facility

6.14.1 A Berthing wharf of length 100 m and width 5m is proposed to be constructed near the south breakwater. The wharf is supported on 75cm diameter piles spaced at 6m effective span on length wise direction and 3.8 m effective span on transverse direction. Length of the proposed pile assumed as 27.35 m including 3.5m steel lining works. The deck slab of 20cm thickness is supported on longitudinal beams and cross beams of size 40x 80 cm. RCC M35 grade concrete is used for piles and M30 is used for beams slabs etc.

6.14.1 Total amount of estimate comes to Rs. **2,14,00,000** including 18 % GST

6.15 Effluent Treatment Plant

6.15.1 Lump sum provision of **Rs. 35.00 Lakh**is included in this estimate for construction of ETP.

6.16 Navigational Aid

6.16.1 Lump sum provision of **Rs. 2.00 Lakh** is included in this estimate to set up navigational aids in the harbour.

6.17 Pressure Washer and Cleaning Equipments

6.17.1 Lump sum provision of **Rs. 6.00 Lakh** is included for pressure washers, cleaning equipment, pump sets etc. All these were executed in various fishing harbours and the expenditure toward the same is included here.

6.18 Landscaping, Green Belt and Rainwater Harvesting

6.18.1 Lump sum provision of **Rs. 20.00 Lakh**is included in this estimate to set up facilities for landscaping, rainwater harvesting and green belt.

6.19 Mechanical conveyor system & Automation

6.19.1 Lump sum provision of **Rs. 150.00 Lakh** is included in this estimate to set up facilities for mechanical conveyor system &automation.

6.19.2 Electrification and Installation of Solar energy system

6.19.3 Lump sum provision of **Rs. 250.00 Lakh** is included in this estimate to set up facilities for electrification and Installation of Solar energy system

6.20 Cost Estimate

6.20.1 The cost estimate for the project has been worked out with the help of PRICE software. Rate analysis for such projects is included for HED in the software. The quantities of various items of work for breakwaters are calculated from the areas of cross sections of the structure plotted in AutoCAD. CPWD schedule of rates with current cost index for Kasargod District is adopted for the cost estimate.

6.20.2 The general abstract of cost estimate of the project is shown below. The detailed cost estimate is appended to this report

Table 6.1General Abstract of Cost

Sl No	Item	Quantity	Unit Rate in Rs	Amount in Rs
1	Construction of Breakwater at Ajanoor	1575m	772063.5	121,60,00,000
2	Construction of river training wall and and dredging near the river training area	Training wall-435m Dredging- 31000 m3		32,60,00,000
3	Dredging And Construction of reclamation Bund	Dredging - 132500 m3 Reclamation bund- 400 m		6,24,00,000
4	Wharf and Auction Hall	Wharf - 120 m x 6.6 m , Auction Hall - 60 m x 15m Total 1692m3	34929.1	5,91,00,000
5	Canteen, Rest shed, Locker room, Gear Shed	45 m x 10 m (two Storey)	27666.7	2,49,00,000
6	Compound wall and Side Protection Works	Compound wall- 510 m Side protection- 1710 m		6,14,00,000
7	Gate and Gate House	2.4 m x 2.4 m ATM and Toll Booth each (area 47.16m2)	38167.9	18,00,000
7	Internal Road, Parking area and Drainage facility	Parking Area - 4320 sqm	3873.6	2,82,00,000
		Internal Road - 740*4 m		
8	Toilet Block	13.3*5	37594.0	25,00,000
9	Construction of approach road to fishing harbour	950 m	14526.3	1,38,00,000
10	Construction of workshop building	9.8*9.8 m	48521.4	46,80,000
11	Construction of office room cum harbour surveillance camera room	14.6*22.6 m (2 storey)	26851.7	89,00,000
12	Construction of wharf for berthing facility	100*5 m	42800.0	2,14,00,000
15	OH Tank and Water Supply Arrangement	As per estimate		1,89,00,000
14	Effluent Treatment Plant	LS		35,00,000
17	Navigational Facility	LS		2,00,000
18	Pressure Washer and Cleaning equipments	LS		6,00,000
19	Landscaping, Green Belt and Rainwater Harvesting	LS		20,00,000

24	Mechanical conveyor system & Automation	LS	1,50,00,000
23	Electrification and Installation of Solar energy system	LS	2,50,00,000
		Total (A)including GST	**189,62,80,000**
Smart Infrastructure and automated systems			
30	Smart Technology Investments		
30.1	Procurement and installation of smart infrastructure components, such as IoT devices, sensors, communication networks, and data management systems including cost of hardware, software, and installation services.	LS	1,00,00,000
30.2	Development or customization of software for data management, analysis and visualization	LS	50,00,000
31	Communication and Connectivity		
31.1	Deployment of communication infrastructure, including internet connectivity, satellite communication systems, and wireless networks	LS	50,00,000
31.2	Implementation of networking equipment and cyber security measures	LS	50,00,000
32	Safety and Security Measures		
32.1	Investment in safety equipment (distress beacons and rescue drones)	LS	50,00,000
32.2	Installation of surveillance system including CCTV camera	LS	50,00,000
35	Provide charging stations for electric vehicles	L.S	10,00,000
36	Vehicle for installing IOT devices	L.S	35,00,000
		Sub total	**3,95,00,000**
		GST @ 18%	**71,10,000**
		Sub Total(B) including GST @ 18%	**4,66,10,000**
		Sub Total (C= A+B)	**194,28,90,000**
		Contingencies @ 3%	**5,71,10,000**
		Grand Total	**200,00,00,000**
Rupees Two hundred crore only			

6.21 Source of Fund

6.21.1 The project is proposed under PMMSY. As per guidelines, the funding will be shared between Centre and State in the ratio 60:40.The sunken costs of surveys, investigations and model studies have already been incurred by HED. Major partof the project management cost shall be met by the department and the work charged establishment proposed in the DPR is only for the additional technical man power required for implementing the project.

6.22 Procurement

6.22.1 The project shall be implemented by HED by the standard procurement procedure in force in the department. Upon obtaining administrative approval for the project, the proposal shall be studied in detail and subjected to technical sanction from the Chief Engineer who is delegated with the powers for projects of such value. Agency for execution of the work shall be selected by way of inviting e-tenders with Pre- Qualification system. The bids are subjected to scrutiny of prequalification committee to select qualified bids. The statutory tender committee selects the best offer to arrive at a contract.

6.23 Implementation Schedule

6.23.1 A detailed WBS and program of work shall be formulated on real time basis on scheduling software during the technical sanction procedure to finalize the baseline schedule. At present, it is estimated that a period of 48 months is required for the implementation of the work.

Implementation Schedule

Construction of Ajanur Fishing Harbour

Sl No	Stages of Implementation	Month																								
		1st	3rd	5th	7th	9th	11th	13th	15th	17th	19th	21st	23rd	25th	27th	29th	31st	33rd	35th	37th	39th	41st	43rd	45th	47th	48th
1	Technical Sanction and Tendering																									
2	Construction of Breakwater at Ajanoor																									
3	Construction of River training work and Dredging near the river training area																									
4	Dredging And Construction of reclamation Bund																									
5	Wharf and Auction Hall																									
6	Canteen ,Rest shed, Locker room,gear shed																									
7	Compound wall and side Protection works																									
8	Gate and Gate House																									
9	Construction of Wharf for Berthing Facility																									
10	Internal Road ,Parking area and Drainage facility																									
11	Sewage treatment Plant																									
12	Water Supply Arrangement																									
13	Electrification																									

6.24 Manpower Requirement and Capacity Building

6.24.1 HED has the necessary resources to carry out surveys, designs, estimation, scheduling, procurement and project implementation management. Each of the project location has a sub-divisional office headed by Assistant Executive Engineer to implement the project. The Divisional office at Kasargod headed by Executive Engineer and the North Circle office at Kozhikkode headed by Superintending Engineer shall be in charge of procurement, monitoring and control of the projects. Surveys and investigations are carried out by the HED Investigation & QC sub division, Vellayil.

6.24.2 The department has its offices and trained project resources to supervise the implementation of the project. The North Circle office at Kozhikkode will be doing the procurement process subjected to the approval of the tender committee. The division office in Kasargod District with the help of the Sub division offices shall be supervising the project execution and billing. Quality control is done looked after by the field office and monitored by the quality control subdivision. HED also has the change management system in place wherein any changes in scope, time and cost shall be regulated.

6.24.3 Thus, the department already possesses the required resources and expertise to carry out the project. The overhead on project formulation and management is borne by HED.

7. ECONOMIC EVALUATION

7.1 Cost-Benefit Analysis

7.1.1 Economic viability depends upon the sustainability of project effects. Projects are sustainable if their net benefits or positive effects endure as expected throughout the life of the project. Sustainability is enhanced if environmental effects are internalized, and if financial returns provide an adequate incentive for project related procedures and consumers. The concept of financial profit is not the same as economic profit. The financial analysis of a project estimates the profit accruing to the project-operating entity or to the project participants, whereas economic analysis measures the effect of the project on the national economy. For a project to be economically viable, it must be financially sustainable as well as economically efficient. If a project is not financially sustainable, economic benefits will not be realised. Financial analysis and economic analysis are therefore two sides of the same coin and are complementary.

7.1.2 Fishing harbours and related infrastructures created are primarily meant for poor fishermen communities in respective locations and any development in this sector can be considered to be a service oriented one rather than a commercial one. However, if an economic analysis is carried out for any fishery related infrastructure or the like, the cost benefit accrued will be highly promising.

7.1.3 On detailed analysis, the cost-benefit ratio of Ajanur fishing Harbour comes to 1.37. The detailed cost-benefit analysis is provided in the appendix. The intangible benefits such as increased safety of fishermen's life and property and general improvement in the overall working of the harbour is beyond a cost-benefit analysis and thus cannot be included. Considering the resources potential of the area, investment proposal of the project is found to be economically viable. The total project cost comes to Rs20,000 lakhs. The amount can be met from PMMSY scheme.

7.2 Project Risk Analysis

7.2.1 Risk identification, probability and impact of risks and risk response strategy are worked out to reduce negative risks and to harness positive risks. The risks identified and response strategy are listed below

Sl. No.	Risk	Positive/ Negative	Probability	Impact	Mitigation measure
1	Delay in statutory clearances	-ve	10%	Delay in commencement	Fast tracking of execution
2	Ban on mining during elections	-ve	25%	Delay in commissioning	Accept
3	Lack of competition in tenders	-ve	25%	Tender excess	Contingency reserve included in the cost
4	Hazards in execution in marine environment	-ve	10%	Delays	Risk transferred to contractor
5	Flood/ Hurricane	-ve	10%	Losses to structure	Accept the risk
6	Pandemics like COVID-19	-ve	10%	Delays	Accept the risk

8. CONCLUSION

8.1.1 The proposal for the development of a fishery harbour at Ajanur is presented in this report. The main component of the proposal is extension of two breakwaters and river training work to create permanent tranquil basin for the safe landing of vessels in all seasons. The other facilities included are construction of wharf, auction hall, internal roads, parking area, loading area, water supply, electrification, drainage and sanitation arrangements, dredging etc. This project is absolutely necessary for the social and financial improvement of fishermen folk living in and around the proposed site. The total estimated cost for this project comes to Rs. 20000 lakh.This harbour construction will contribute to the socio-economic uplift of the area especially the downtrodden fishermen community and also provide employment to thousands of people both directly and indirectly. Considering the resource potential of the area and investment proposed, the project is found to be economically viable. The State Government requests the Government of India to sanction financial assistance for implementation of construction of Fishing Harbours under PMMSY.

WHARF LENGTH CALCULATION

Landing, Outfitting, Repair and Berthing lengths

After considering the current fleet size operating from this area, the design fleet size of this harbour is arrived - motorised non- mechanical vessels - 553 Nos of 15m (avg length), motorised mechanical vessels -50 nos of 10 m (avg length) and traditional boats (non-motorised) - 30 nos of 8 m (avg length)

Of this, landing quay facilities are to be created for the MFVs, non MFVs and traditional vessels. Additional wharf lengths may be provided for landing, berthing and outfitting facilities for the MFVs, non MFVs and traditional vessels. The number of boats, length, annual average landing, etc. is given below in the statement form.

Overal vessel length (m)	Number of vessels	Fishing trips (days)	Fishing trips per year	Average daily landing
8	30	1	220	60
10	50	1	150	800
15	553	1	44	1136

The following assumptions are made while calculating the length of landing quays.

• At any time, 10% of the totals fishing fleet are not fishing due to maintenance, repair or any other reason.

• The vessels that go on 5 days trip will be equally distributed on each with same number of departures/ arrivals.

• Duration of fish landing hours in the fishery harbour will be 6 hours.

• An unloading rate of 4500kg/hour is assumed considering that the fish will be unloaded in fish baskets/boxes manually.

• During the peak month of the fishing season, some boats are expected to arrive with additional fish catch. Though this larger catch is expected to arrive only on a few days during the peak season, it has been safely assumed that daily on an average, 40% of the 8m vessels arrive in the peak hour with 20% additional fish catch, 20% of the 10 m vessels will arrive with additional 15 % increase in the fish catch. and 30% of the 15 m vessels will arrive with additional 10% increase in the fish catch.

Landing length for 15 m vessels: No landing length required as carrier vessels bring the catch to land.

Landing Length for 10 m Vessels on wharf				
Number of Vessels considered		=	50	
Number of boats operating per day (90%)	0.90x50	=	45	
Number of boats arriving in an hour (20%)	0.20x45	=	9	
Average fish landing / boat		=	800	kg
Peak landing per boat (+20%)	1.20x800	=	960	kg
Time required for unloading @4500/hr	960 x 60 / 4500	=	13	minutes
Time required for docking and undocking	2+2	=	4	minutes

Total time required	4+13	=	17	minutes
Number of berths required to handle 8 vessels in one hour	9x17/60	=	3	Nos
Landing quay length required	3(10+1)	=	28	metre

Landing Length for 8 m Vessels on wharf				
Number of Vessels considered		=	30	
Number of boats operating per day (90%)	0.90x30	=	27	
Number of boats arriving in an hour (40%)	0.40x27	=	11	
Average fish landing/ boat		=	60	kg
Peak landing per boat (+20%)	1.20x60	=	72	kg
Time required for unloading @4500/hr	60x72/4500	=	1	minutes
Time required for docking and undocking	2+2	=	4	minutes
Total time required	4+1	=	5	minutes
Number of berths required to handle 140 vessels in one hour	11x5/60	=	1	Nos
Landing quay length required	1(8+1)	=	8	metre

Outfitting Length for 8 m Vessels

Number of boats requiring outfitting in a peak season per day	0.90x30	=	27	
Time required for each boat to receive fuel water and ice		=	10	minutes
Duration of outfitting hours		=	8	hours
Number of berths required for Outfitting	27x10/8x60	=	1	
Length of Outfitting required	1(8+1)	=	5	metre

Outfitting Length for 10 m Vessels

Number of boats requiring outfitting in a peak season per day	0.90 x50	=	45	
Time required for each boat to receive fuel water and ice		=	10	minutes
Duration of outfitting hours		=	8	hours
Number of berths required for Outfitting	45x10/8x60	=	1	
Length of Outfitting required	1(10+1)	=	11	metre

Outfitting Length for 15 m Vessels

Number of boats requiring outfitting in a peak season per day	(0.90*553) / 5	=	100	
Time required for each boat to receive fuel water and ice		=	10	minutes
Duration of outfitting hours		=	8	hours
Number of berths required for Outfitting	(100x10)/(8x60)	=	2	
Length of Outfitting required	2(15+1)	=	33	metre

Berthing Length

Berthing length is provided for idle berthing of 20% of vessels after unloading their catch and before proceeding on a fishing trip. The remaining vessels can anchor innside the river for idle berthing during fair season. The vessels are assume to berth four abreast while idel berthing)

Berthing Length for 8 m Vessels

Berthing is provided for 20 % of vessels	0.20x30	=	6	
Assuming vessels berth 4 abreast. Number of berth required		=	2	
Landing berth available		=	1	
Outfitting berth available		=	1	
Number of berth to be provided	2-(1+1)	=	0	
Berthing required for 8 m vessels	0x(8+1)	=	0	metre

Berthing Length for 10 m Vessels

Berthing is provided for 20 % of vessels	0.20x50	=	10	
Assuming vessels berth 4 abreast. Number of berth required		=	3	
Landing berth available		=	3	
Outfitting berth available		=	1	
Number of berth to be provided	3-(3+1)	=	0	
Berthing required for 10 m vessels	0x(10+1)	=	0	metre

Berthing Length for 15 m Vessels

Berthing is provided for 20 % of vessels	0.20x553	=	111	
Assuming vessels berth 4 abreast. Number of berth required		=	28	
Landing berth available		=	0	metre
Outfitting berth available		=	2	metre
Number of berth to be provided	28-(0+2)	=	26	
Berthing required for 6 m vessels	26x(15+1)	=	409	metre

Repair length

Provide repair quay of 1 boat length

8 m vessel	8+1	=	9	metre
10 m vessel	10+1	=	11	metre
15 m vessel	15+1	=	16	metre

Summary of waterfront length required					
Overall length of Vessels (m)	Landing length (m)	Outfitting length (m)	Berthing length (m)	Repair length (m)	Total length (m)
As per calculation					
8	8	5	0	9	22
10	28	11	0	11	50
15	0	33	409	16	458
Total					**530**

Annexure 17.2 of Harbour& Coastal Engineering (Indian Scenario): Vol.II of C.T.BETGERI, Deputy Director Central Institute of Coastal Engineering for Fisheries, Bangalore India.

530 m wharf is required in the harbour. In the first phase a wharf length of 220m is proposed

COST BENEFIT ANALYSIS

Construction of Ajanur Fishing Harbour						
Cost Benefit Analysis						
The fish landings and toll revenue should be accounted for the original investment of constructing the harbour. But special investment is required to make the harbour operational throughout the year and this will gain 30 additional fishing days for the harbour. The amount for this comes to 30x500000 = 150 Lakhs per year. As the original cost is also taken for cost benefit analysis, a total of 300 fishing days is taken for the benefit calculations						
PROJECT COST						
Year	**Expansion of Ajanur Fishing Harbour**	**Quantity**	**Unit**	**Rate /Unit in Lakh Rs**	**Cost in Lakh Rs.**	**PV**
0	First Year amount				8000.00	8000
1	Balance works year 2				8000.00	7273
2	Balance works year 3				4000.00	3306
3						
4						
5	Replenishment / Maintenance of harbour @ 2.0% of construction cost / 5 yrs				400.00	248
6						
7						
8						
9						
10	Replenishment / Maintenance of harbour @ 2.0% of construction cost / 5 yrs				400.00	154
11						
12						
13						
14						
15	Replenishment / Maintenance of harbour @ 2.0% of construction cost / 5 yrs				400.00	96
	Total				**21200.00**	**19076.86**

PROJECT BENEFITS						
Year	**Expansion of Muthalapozhy Fishing Harbour**	**Quantity**	**Unit**	**Rate /Unit Lakh Rs**	**Cost in Lakh Rs.**	**PV**
1	Nil					
2	Nil					
3	Fuel savings, 633 boats, (5Lx300daysxRs.120/L)	633	Nos	1.8	1139.40	856
3	Savings on Road transportation of fishermen and gears, 633 boats, van charges Rs1500/day x 300days	633	Nos	4.5	2848.50	2140
3	Time value saving on catch	633	Nos	0.5	316.50	238
3	Additional Fish Landings	30	Days	5	150.00	113
3	Toll/user charges	30	Days	0.333	9.99	8
4	Savings on fuel, transportation, time, fish landings and toll added together for 4th year				4464.39	3049
5	=Do=				4464.39	2772
6	=Do=				4464.39	2520
7	=Do=				4464.39	2291
8	=Do=				4464.39	2083
9	=Do=				4464.39	1893
10	=Do=				4464.39	1721
11	=Do=				4464.39	1565
12	=Do=				4464.39	1422
13	=Do=				4464.39	1293
14	=Do=				4464.39	1176
15	=Do=				4464.39	1069
	Total				**58037.07**	**26208**
					NPV=	7132
					B/C=	**1.37**

BORE HOLE DETAILS

BORE LOG

PROJECT : General investigation work for the proposed Ajanur Fishery Harbour
LOCATION : Kanhangad Harbour
CLIENT : Executive Engineer, Harbour Engineering Division, Kasargod

BORE HOLE NO :6
TYPE OF BORING : Rotary Drilling
DATE OF START : 28/12/2022
DATE OF FINISH : 29/12/2022

WATER TABLE LEVEL (From GL):	1.70 m	SAMPLES	
RL :		SPT :	14
TERMINATION DEPTH :	25.75 m	DS :	13

Depth (m)	Soil Profile	Description of the soil	Thickness of Layers (m)	Standard penetration test data					Graphical representation of 'N' value	Remarks
				Depth (m)	15	30	45	N		
0		Ordinary Sand Soil	0.4	0.00					0 15 30 45 60	
0.4		Sand	10	1.50	5	8	13	21		
				3.00	13	14	14	28		
				4.50	15	28	22	>50		Balance- 2 cm
				6.00	18	31	19	>50		Balance- 4 cm
				7.50	25	>50	-	>50		Balance- 17 cm
				9.00	10	13	18	31		
10.4		Clay	7.5	10.50	1	1	1	2		
				12.00	1	1	2	3		
				13.50	1	1	1	2		
				15.00	1	2	1	3		
17.9		Stiff Clay	5.7	18.00	12	14	18	32		
				21.00	12	19	27	46		
23.6		Silty Weathered	2.15	24.00	18	31	19	>50		Balance- 5 cm
25.75				SPT Rebounded at 25.75m						No Sample

Bore Hole terminated at 25.75 m

Asst.Engineer

Asst. Exe. Engineer

MODEL STUDY REPORT

भारत सरकार / Government of India
जल शक्ति मंत्रालय / Ministry of Jal Shakti
जल संसाधन, नदी विकास और गंगा संरक्षण विभाग
Department of Water Resources, River Development and Ganga Rejuvenation
केन्द्रीय जल और विद्युत अनुसंधान शाला
खडकवासला, पुणे – 411 024
CENTRAL WATER & POWER RESEARCH STATION
Khadakwasla, Pune – 411024

MATHEMATICAL MODELLING FOR COASTAL ENGINEERING DIVISION
(Coastal and Offshore Engineering Laboratory)

TECHNICAL REPORT No.: 6283
July 2024

मछली पकड़ने के बंदरगाह के निर्माण के कारण जल-गत्यात्मकता और गाद का आकलन करने के लिए गणितीय प्रतिमान अध्ययन अजनूर, केरल

MATHEMATICAL MODEL STUDIES TO ASSESS HYDRODYNAMICS AND SILTATION DUE TO CONSTRUCTION OF FISHING HARBOUR AT AJANUR, KERALA

Dr. R. S. Kankara
Director

REPORT DOCUMENTATION SHEET

Technical Report No. 6283 **Date: July 2024**

Title: MATHEMATICAL MODEL STUDIES TO ASSESS HYDRODYNAMICS AND SILTATION DUE TO CONSTRUCTION OF FISHING HARBOUR AT AJANUR, KERALA

Officers Responsible for Conducting the Studies

The studies were conducted by Boora Krishna, Scientist 'B', Dr. Naren Scientist 'B' and Naval Jagatap, Scientist 'B' under the supervision of Dr. Jiweshwar Sinha, Scientist 'E' and Dr. Prabhat Chandra, Additional Director and overall supervision of Dr. R. S. Kankara, Director, CWPRS, Pune.

Name and Address of Organization Conducting the Studies

Mathematical Modelling for Coastal Engineering Division
Central Water and Power Research Station, Pune - 411 024

Name and Address of Authority Sponsoring the Studies

Chief Engineer,
Harbour Engineering Department (HED),
Kamaleshwaram, Manacaud - P.O, Thiruvanathapuram – 695 009

Synopsis

Mathematical model studies to assess hydrodynamics and sedimentation aspects for the proposed development of fishing harbour at Ajanur was referred to CWPRS by Chief Engineer, HED, Kerala. The model simulations for hydrodynamics and sedimentation were carried out for the existing and the proposed condition.

As per the wave and littoral drift simulation results the proposed layout having 1150m long north breakwater, 425m long south breakwater, 435m breakwater as a river training work was studied for hydrodynamics and siltation point of view. Further, dredging upto -2m in the approach channel of the Chittari river mouth with appropriate dredging along the river was incorporated in the model. Also, dredging upto -4m in the harbour basin was considered in the hydrodynamic model simulations. The model results revealed that the annual sedimentation i.e. depth of deposition for the proposed condition in the harbour basin would be about 0.03m per year whereas depth of deposition at the river mouth would be about 0.045m in a year. A reduction in current speed due to the proposed development in the channel i.e. dredging of the channel up to -2m as well as in the proposed harbour basin would cause the loss of depth in the site. Further, an annual sedimentation of about 0.05m along the north and south of the breakwaters is also observed from the model results. Based on the model results, the proposed layout of the training works and the harbour basin is found to be suitable with the prevailing conditions at the site.

Key Words: Mathematical Model, Breakwater, Current, Sedimentation, MIKE 21

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MATHEMATICAL MODEL STUDIES TO ASSESS HYDRODYNAMICS AND SILTATION DUE TO CONSTRUCTION OF FISHING HARBOUR AT AJANUR, KERALA

Technical Report No.:6283	**DATE: July 2024**

1.0 INTRODUCTION

Harbour Engineering Department (HED), Government of Kerala proposed to develop a fishing harbour at Ajanur situated about 15km south of Kasaragod district. Ajanur fishing harbour is located geographically at Latitude 12.33^0 N and Longitude 75.18^0 E in Kerala state on the western coast of India. Fig. 1 shows the location map of Ajanur fishing harbour.

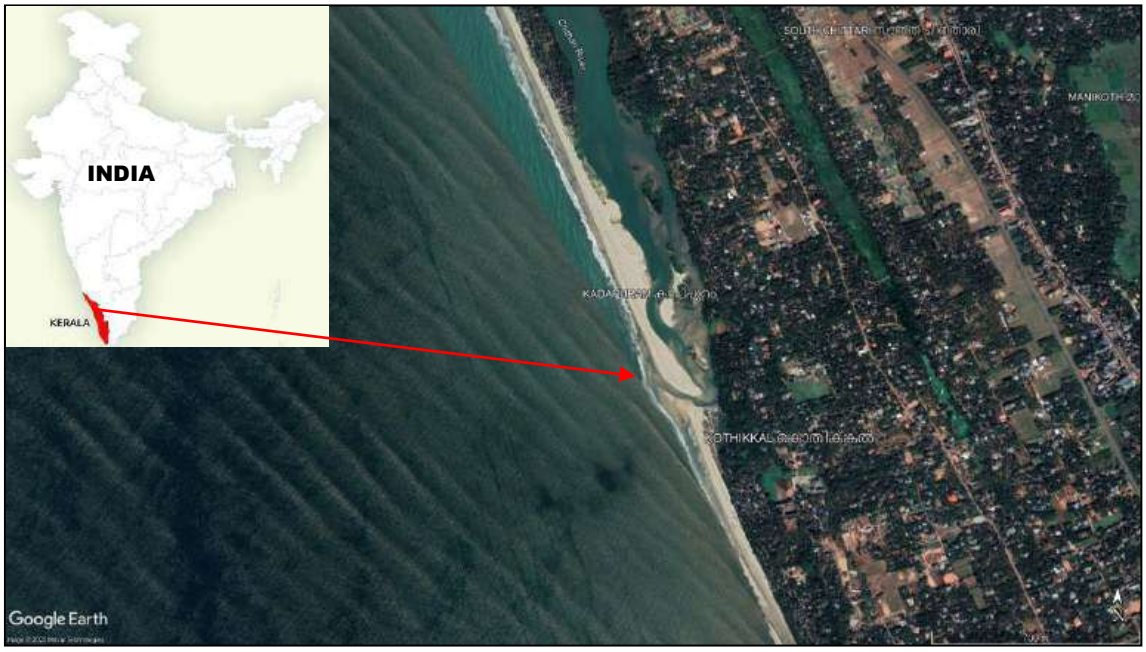


Figure 1: Location of Site at Ajanur

CWPRS carried out wave model studies on the same study area in the year 2016. These studies proposed one final layout of fishing harbour. As per the CWPRS 2016 report vide T. R. No. 5436, Nov 2016, the harbour basin area is about 19 hectares. Considering the future expansion as suggested by the Technical Sanction Committee of Pradhan Mantri Matsya Sampada Yojana (PMMSY) scheme vide HED Letter No. D4/9509/06/CE dated 16-06-2022, HED proposed a revised layout of the Ajanur fishing harbour. The revised layout consists of 1150m long north breakwater, 425m long south breakwater and 435m breakwater as a river training work near the mouth of Chittari river. River training work is proposed in the present layout considering two major coastal processes: - (i) control of shifting and closing of Chittari River mouth due to sedimentation (ii) Southward littoral drift and littoral zone consideration (from CWPRS study T. R. No 5357 Feb 2016). The revised layout is shown in Fig. 2.

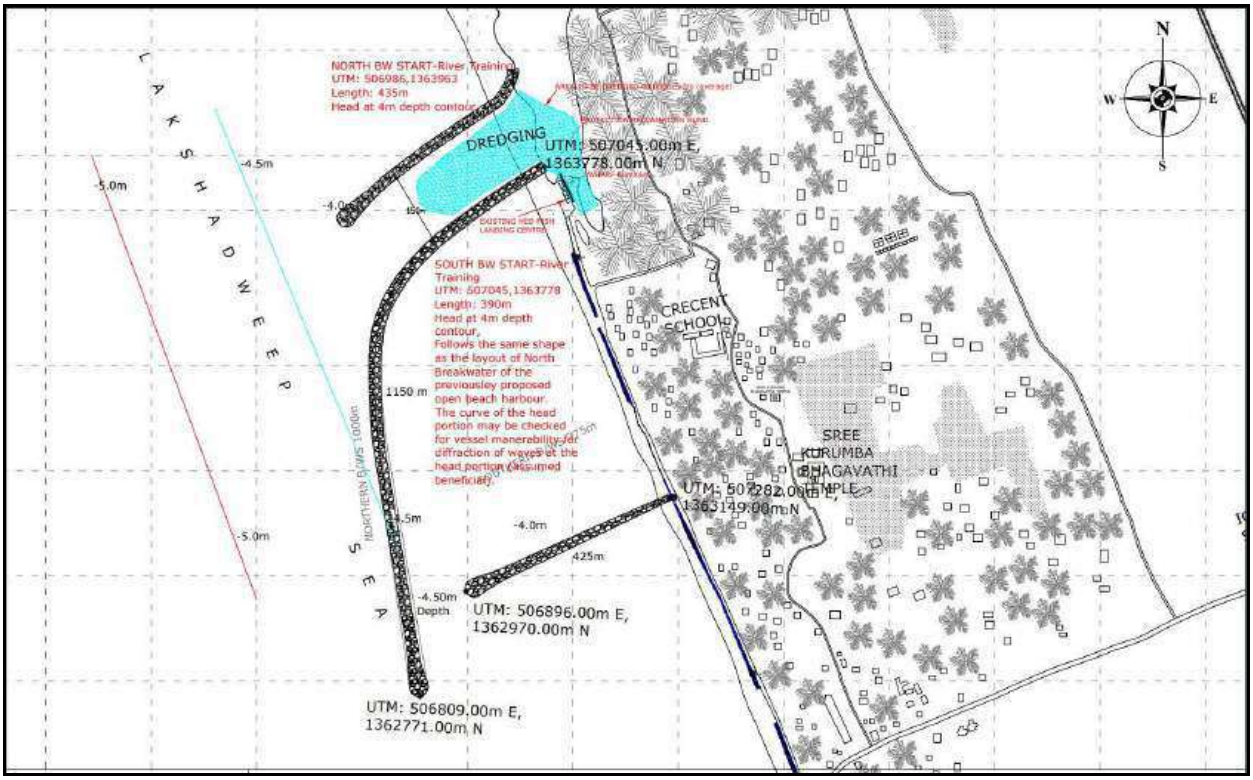


Figure 2: Proposed Layout at Ajanur

2.0 SCOPE OF STUDIES

Mathematical model studies to assess the hydrodynamics and siltation due to the proposed construction of fishing harbour are undertaken.

Following are the objectives of the present studies:

(i) To study the hydrodynamics and siltation with the existing condition.

(ii) To study the changes in hydrodynamics and siltation with the proposed condition wherein fishing harbour layout and river training work are included.

3.0 DATA ANALYSIS

The data required for the model studies are bathymetry of the area, tidal data, grain size distribution, suspended sediment concentration, river discharge, if any etc. HED, Kerala, the Project Authority (PA) has conducted field survey to collect the aforementioned data during March 2023. Earlier, PA conducted survey to collect the data in the year 2022 (1st June to 7th June). After examining the data, it was found that the data was not appropriate for numerical modelling. Hence, a re-survey for collecting the data were conducted by PA between 15th March to 20th March 2023. The data is collected both in river region (Lat:12.347, Lon 75.062) and in offshore region (Lat: 12.334 Lon: 75.0611). Henceforth, in this report these two points are called as P1 and P2 respectively as per Fig. 3. The details of the data collected are discussed below.

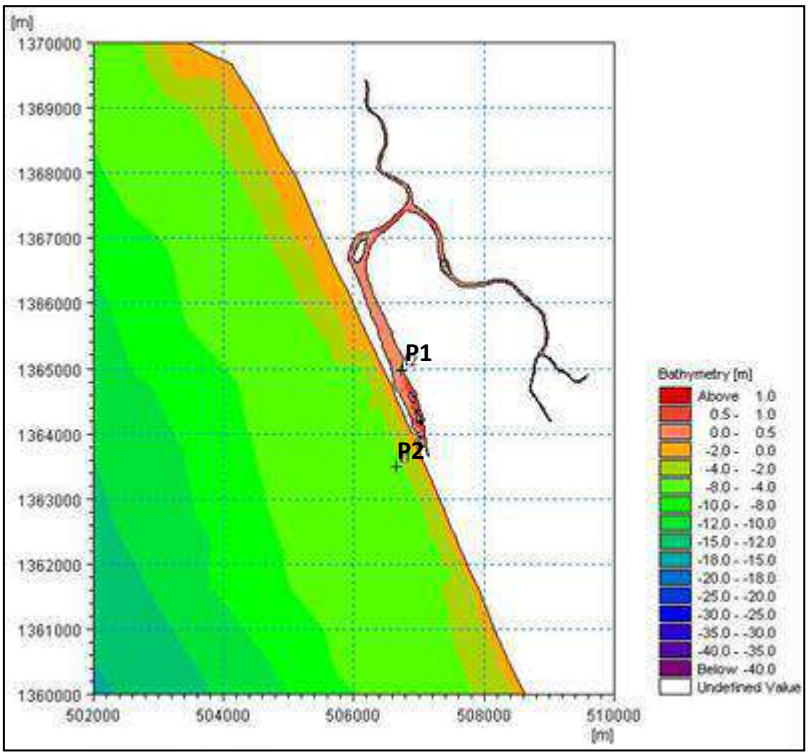


Figure 3: Field data collection points

3.1 Bathymetry

The bathymetric data for offshore shore region is obtained from C-MAP data. The nearshore bathymetry data is obtained from the hydrographic charts supplied by PA. The Acoustic Doppler Current Profiler (ADCP) of CWPRS is used to obtain the data of water level depth over the estuary and river region. The water level depth measurements are further used to estimate the bathymetry. The estimated bathymetry used in this study is shown in Fig 4.

3.2 Tides

Tidal data is collected from 15th March 2023 to 20th March 2023 at two different locations i.e., river (P1: Lat:12.347, Lon 75.062) and over sea region (P2: Lat: 12.334 Lon: 75.0611) as mentioned above. The tide data obtained at P1 and P2 w.r.t Mean Sea Level (MSL) is shown in Fig. 5. The MSL at Ajanur is 0.98m. It is observed that the spring tide tidal range (Global Tide) is about 1.30m. It is observed from the plot that tidal data at P1 is almost continuous with few missing values. However, the data at P2 is discontinuous not following usual tidal trends.

3.3 Tidal Currents

Field observed current data collected at locations P1 and P2 during March 2023 is shown in Fig 6. It is observed that the current data at both P1 and P2 shows numerous spikes at different time steps. Tide and currents data find importance in the study for calibrating the model**.**

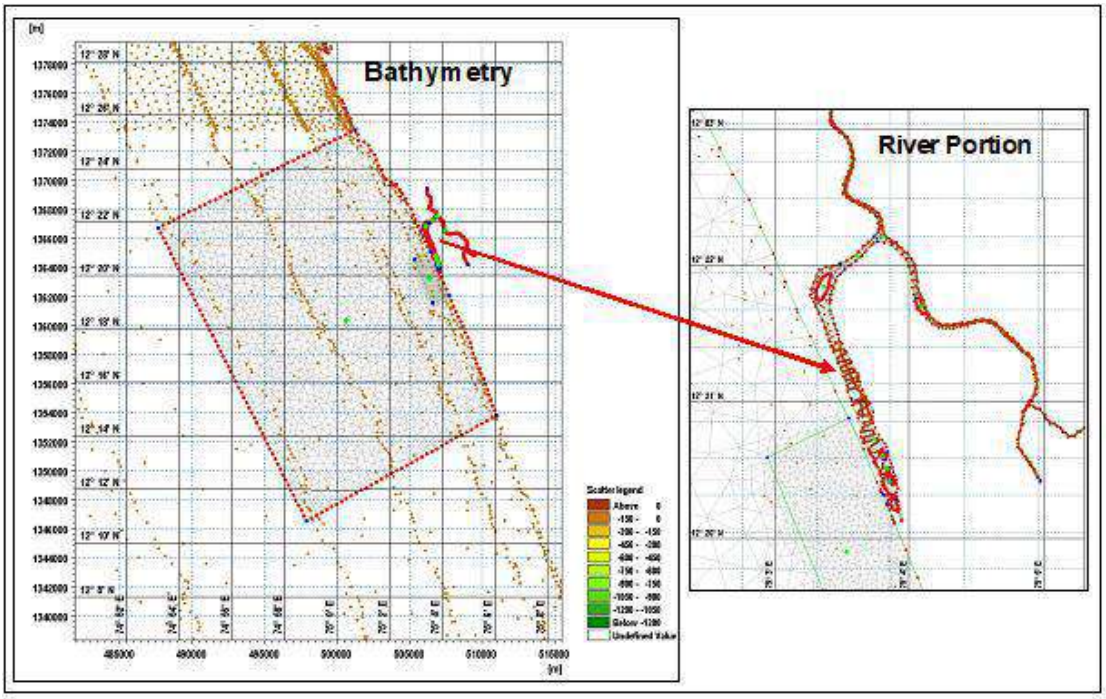


Figure 4: Bathymetry data

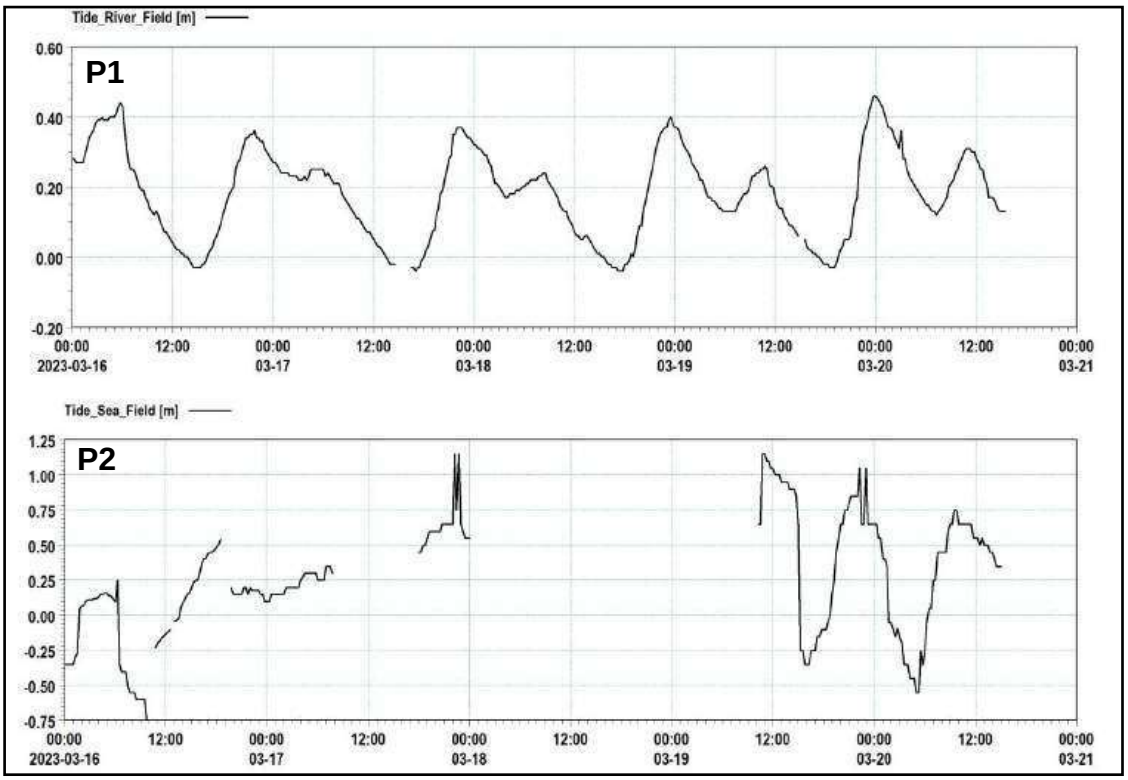


Figure 5: Observed tides at P1 and P2

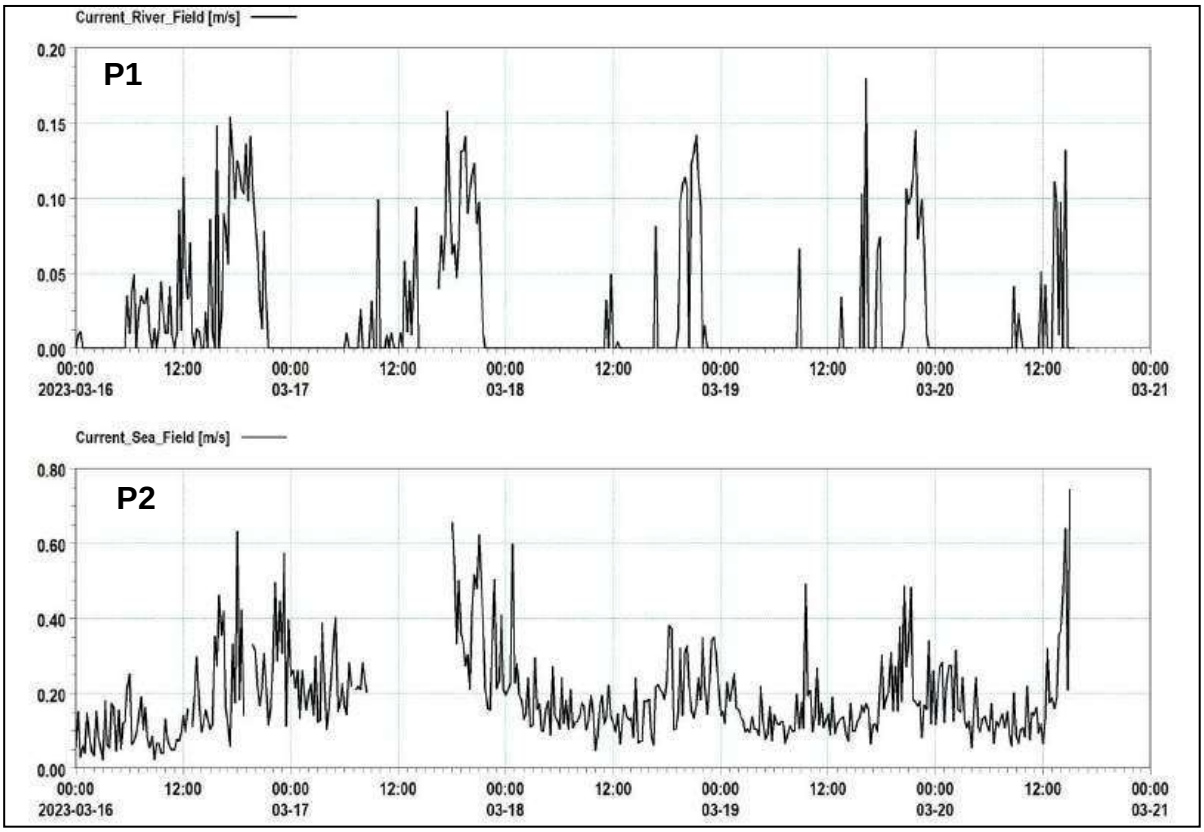


Figure 6: Observed current at P1 and P2

3.4 Sediment Data

The sediment data is collected and supplied by HED which comprised of the bed sample taken in the year 2022. The average D_{50} is 0.064mm in sea and D_{50} in river is 0.210mm.The grain size distribution at P1 and P2 is shown in Fig. 7. Water samples are collected at river and sea point (P1 and P2) during March 2023 to estimate the Suspended Sediment Concentration (SSC). From the data it is observed that SSC varies at P1 from 0.1mg/l to 0.15mg/l. Whereas, variation of SSC is between 0.05mg/l to 0.11mg/l at P2. The average suspended sediment concentration (SSC) in is 0.210mg/l and 0.08mg/l at P1 and P2 respectively. These average values of SSC are used for modelling.

3.5 Discharge Data

The river discharge is also a required parameter for calibrating the model. The river Chittari is a non-perennial river having variation in discharge during monsoon and non-monsoon seasons. As per HED, the river carries minimal discharge during monsoon and almost no discharge during the non-monsoon season. During the time period of field data collection, discharge in the river is only due to influence of tidal fluxes. The river discharge of 6 m^3/s is obtained through river ADCP observations is considered for non-monsoon season and for monsoon season, 25 m^3/s discharge is considered for modelling.



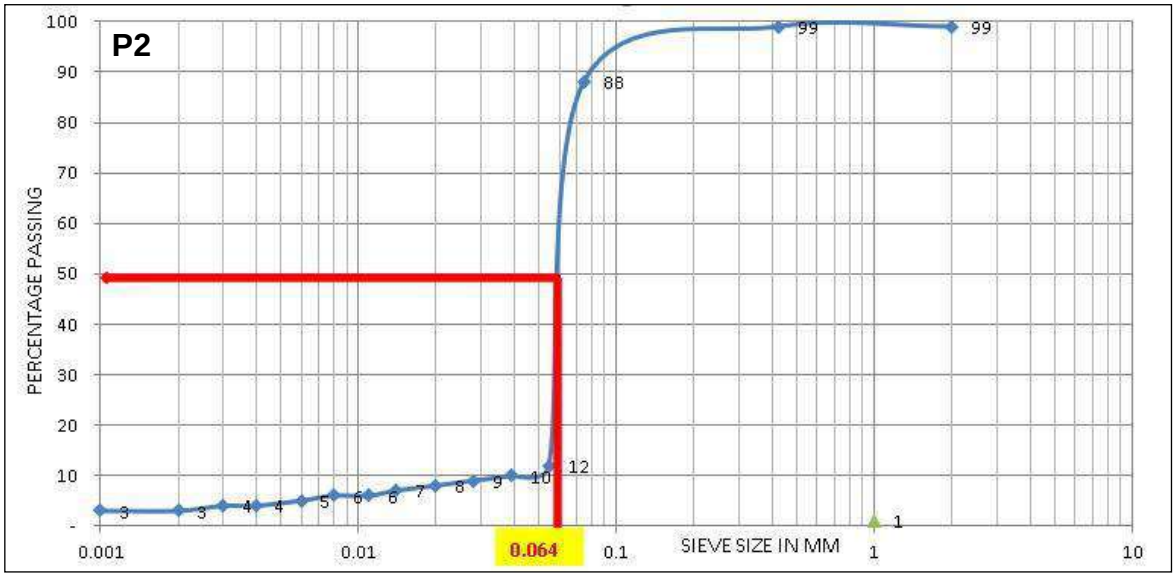


Figure 7: Grain size distribution at P1 and P2

Table 1: Details of suspended sediments concentration at P1 and P2

P1				P2			
Sample no.	Date	Time	Suspended solids in mg/l	Sample no.	Date	Time	Suspended solids in mg/l
W1	15/03/2023	7.00pm	0.12	W1	15/03/2023	10.30am	0.07
W1	16/03/2023	8.00 am	0.13	W2	15/03/2023	7.45pm	0.06
W2	16/03/2023	2.00pm	0.1	W1	16/03/2023	3.00pm	0.07
W3	16/03/2023	8.00pm	0.11	W1	17/03/2023	8.00am	0.07
W1	17/03/2023	8.00am	0.14	W2	17/03/2023	8.15pm	0.07
W2	17/03/2023	2.00pm	0.15	W3	17/03/2023	2.00pm	0.11
W3	17/03/2023	8.00pm	0.11	W4	17/03/2023	2.30pm	0.11
W1	18/03/2023	8.00am	0.13	W5	17/03/2023	8.00pm	0.09
W2	18/03/2023	2.00pm	0.11	W1	18/03/2023	8.00am	0.06
W3	18/03/2023	7.00pm	0.13	W2	18/03/2023	1.30pm	0.08
W1	19/03/2023	8.00am	0.1	W3	18/03/2023	9.00pm	0.05
W2	19/03/2023	2.00pm	0.12	W1	19/03/2023	8.00am	0.08
W3	19/03/2023	8.00pm	0.1	W2	19/03/2023	3.00pm	0.1
W1	20/03/2023	7.00am	0.11	W1	20/03/2023	8.30am	0.09
W2	20/03/2023	2.00pm	0.1	W2	20/03/2023	1.00pm	0.07

4.0 METHODOLOGY

The mathematical model studies are carried out using MIKE 21 software using the Flexible Mesh. The flexible mesh is considered as suitable for creeks with meandering coastline. The hydrodynamic studies include simulation of the flow field for the following conditions: -

1. Calibration of the model with the existing site conditions of the year 2023.
2. In the proposed condition, the layout as shown in Fig. 2 is studied for assessment of changes in the hydrodynamics and sedimentation.

The model run to evaluate hydrodynamics would be calibrated with the observed field data along with wave induced currents (radiation stresses) from wave model studies. The calibrated model will be used to predict the changes in the flow pattern for the proposed condition. The results of the above hydrodynamic studies are used as basic input for the sediment transport studies.

Model studies are carried out by coupling the flow models with sedimentation models to predict the evolving changes in sedimentation pattern. The results of these studies show the spatially varying pattern of siltation and erosion. The simulation of hydrodynamics and sedimentation (for existing and proposed condition) is separately performed for monsoon and non-monsoon seasons. The comprehensive detail of the hydrodynamics, wave and siltation studies for both existing and proposed condition is useful information for the coastal population and also the policy makers.

5.0 DESCRIPTION OF MODULES OF MIKE 21 FM

The 2-dimensional hydrodynamic model MIKE 21 HD, Flexible Mesh is used for simulating the flow field in the model domain and MIKE 21 MT for the sediment transport studies in the existing and the proposed scenario under prevailing tidal and wave conditions. The brief description of scientific background of MIKE 21 HD and MIKE 21 MT is given below.

5.1 MIKE-21 HD MODULE:

For any major developments in coastal areas, it is necessary to know dynamics of the water body in terms of velocity and water level fluctuations beforehand. The appropriate governing equations for studying water movement in coastal areas are the two-dimensional shallow water equations. These shallow water equations are obtained by vertically integrating the 3-Dimensional incompressible Reynold's averaged Navier- Stokes equations of motion over depth $h = \eta + d$ with the following simplified assumptions.

- The flow is incompressible,
- The flow is well mixed (no variation in density)
- Vertical accelerations are negligible,
- Bed stress can be modeled.

$$\frac{\partial h}{\partial t} + \frac{\partial h\bar{u}}{\partial x} + \frac{\partial h\bar{v}}{\partial y} = hS \qquad (1)$$

$$\frac{\partial h\bar{u}}{\partial t} + \frac{\partial h\bar{u}^2}{\partial x} + \frac{\partial h\overline{vu}}{\partial y} = f\bar{v}h - gh\frac{\partial \eta}{\partial x} - \frac{h}{\rho_0}\frac{\partial p_a}{\partial x} - \frac{gh^2}{2\rho_0}\frac{\partial \rho}{\partial x} + \frac{\tau_{sx}}{\rho_0} - \frac{\tau_{bx}}{\rho_0} -$$

$$\frac{1}{\rho_0}\left(\frac{\partial s_{xx}}{\partial x} + \frac{\partial s_{xy}}{\partial y}\right) + \frac{\partial}{\partial x}(hT_{xx}) + \frac{\partial}{\partial y}(hT_{xy}) + hu_sS \qquad (2)$$

$$\frac{\partial h\bar{v}}{\partial t} + \frac{\partial h\bar{v}^2}{\partial x} + \frac{\partial h\overline{uv}}{\partial y} = f\bar{u}h - gh\frac{\partial \eta}{\partial y} - \frac{h}{\rho_0}\frac{\partial p_a}{\partial y} - \frac{gh^2}{2\rho_0}\frac{\partial \rho}{\partial y} + \frac{\tau_{xy}}{\rho_0} - \frac{\tau_{by}}{\rho_0} -$$
$$\frac{1}{\rho_0}\left(\frac{\partial s_{yx}}{\partial x} + \frac{\partial s_{yy}}{\partial y}\right) + \frac{\partial}{\partial x}(hT_{xy}) + \frac{\partial}{\partial y}(hT_{yy}) + hv_sS \qquad (3)$$

The over bar indicates a depth average value for example, $\bar{u}$ and $\bar{v}$ are the depth-averaged velocities defined by

$$h\bar{u} = \int_{-d}^{n} u dz\,, \qquad h\bar{v} = \int_{-d}^{n} v dz$$

The lateral stresses T_{ij} include viscous friction, turbulent friction and differential advection. They are estimated using an eddy viscosity formulation based on the depth average velocity gradients.

$$T_{xx} = 2A\frac{\partial \bar{u}}{\partial x} \qquad T_{xy} = A\left(\frac{\partial \bar{u}}{\partial y} + \frac{\partial \bar{v}}{\partial x}\right) \qquad T_{yy} = 2A\frac{\partial \bar{v}}{\partial y}$$

The following symbols are used in the equations:

t	:	Time
x and y	:	Cartesian co-ordinates
$h = \eta + d$	:	Total water depth
d	:	Still water depth
S_{xx}, S_{xy}, S_{yy}	:	Components of radiation stresses
$\tau_{xx}, \tau_{xy}, \tau_{yy}$	:	Shear stress components
ρ	:	Density of water
$\bar{u}\bar{v}$	:	Depth averaged velocities
η	:	Surface Elevation
g	:	acceleration due to gravity (m/s^2)
f	:	wind friction factor related to Coriolis parameter
p_a	:	Atmospheric pressure
ρ_0	:	Density of water
S	:	Magnitude of discharge due to point sources
u_s, v_s	:	velocities at point sources
$f = 2\Omega sin\Phi$	:	Coriolis parameter (Ω is the angular rate of revolution and φ the geographic Latitude)
A	:	Horizontal eddy viscosity

The governing equations are solved by using an element-centered finite volume method. The spatial domain is discretised into non-overlapping elements, which can be either triangular or quadrilateral. The time integration can be done by using first order explicit Euler method (referred to as the lower temporal order scheme) or by using second order Runge Kutta method (referred to as the higher temporal order scheme).

5.2 MIKE-21 MT MODULE

The sediment transport studies were carried out using MIKE 21 MT model. This model simultaneously solves hydrodynamic and sediment transport equations. The calibration of sediment transport model is difficult because morphological changes are too slow and temporal bed changes are too variable to measure anything significant for comparison. The sediment fluxes at various locations may differ and the following factors contribute for these variations:

- Unsteadiness of flow,
- Mixtures of sediment in suspension,
- Variability of supply of mobile sediment on the bed,
- Presence of sandy (non-cohesive) sediment,
- Omission of depth variation,
- Effect of wave stirring.

The erosion, transport and deposition of silt, mud and clay particles under action of currents and waves can be best described by the multi-layers mode of the mud transport module of MIKE 21. The sediment transport module is dynamically coupled with the 2-dimensional hydrodynamic module, MIKE 21 HD. The module solves the primitive equations in two dimensions using finite difference methods by Alternating Direction Implicit technique and the Double Sweep algorithm. Following are the relationships used in the module.

The sediment transport formulations are built into the advection-dispersion module, MIKE 21 AD, which solves advection-dispersion equation:

$$\frac{\partial c}{\partial t}+u\frac{\partial c}{\partial x}+v\frac{\partial c}{\partial y}=\frac{1}{h}\frac{\partial}{\partial x}\left(hD_x\frac{\partial c}{\partial x}\right)+\frac{1}{h}\frac{\partial}{\partial y}\left(hD_y\frac{\partial c}{\partial y}\right)+Q_L C_L\frac{1}{h}-S \qquad (4)$$

The following symbols are used in the equation:

c	:	compound concentration (arbitrary units)
u,v	:	horizontal velocity components in x, y directions (m/s)
h	:	water depth (m)
Dx,Dy	:	dispersion coefficients in the x,y directions (m2/s)
S	:	accretion/erosion term (kg/m3/s)
QL	:	source discharge per unit horizontal area (m2/s/m2)
CL	:	concentration of source discharge (kg/m3)

The advection-dispersion equation is solved using an explicit, third-order finite difference scheme, and known as the ULTIMATE scheme.

6.0 MODEL STUDIES

The MIKE 21 HD module is used to study the hydrodynamics. For studying the sedimentation, MIKE 21 MT module is used. These modules are used for the existing and proposed layouts. The details of MIKE 21 HD and MIKE 21 MT modules used in this study are discussed below.

6.1 Computational Model

The spatial extent of computational model considered for model simulations is 16km (cross-shore) X 22km (along the shore). The computation model with its offshore and onshore boundaries is shown in Fig. 8. The Chittari river discharging into the ocean is considered to a certain extent in the computation model as shown in Fig. 8.

All oceanographic features of the study region in existing condition are incorporated in the computational model. The complete study area was discretised into computational unstructured mesh. The spatial resolution of the mesh is finer along the area of development (harbour area). Finer mesh resolution is adopted near harbour area in order to capture the variation in near shore tide and currents more accurately. The mesh resolution is coarser along the offshore boundary. The developed mesh showing the fine and coarser resolution in the computational model is shown in Fig. 9.

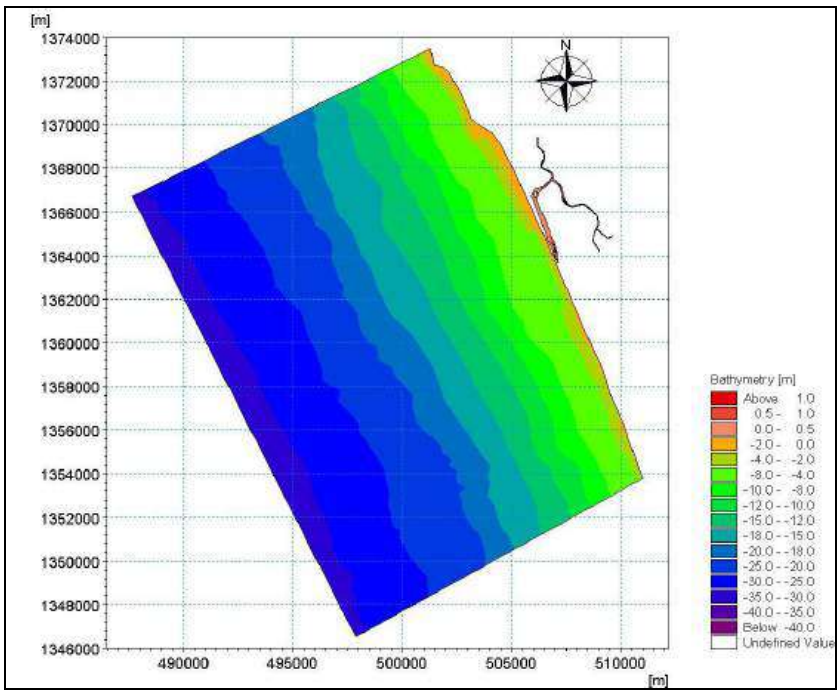


Figure 8: Computational model

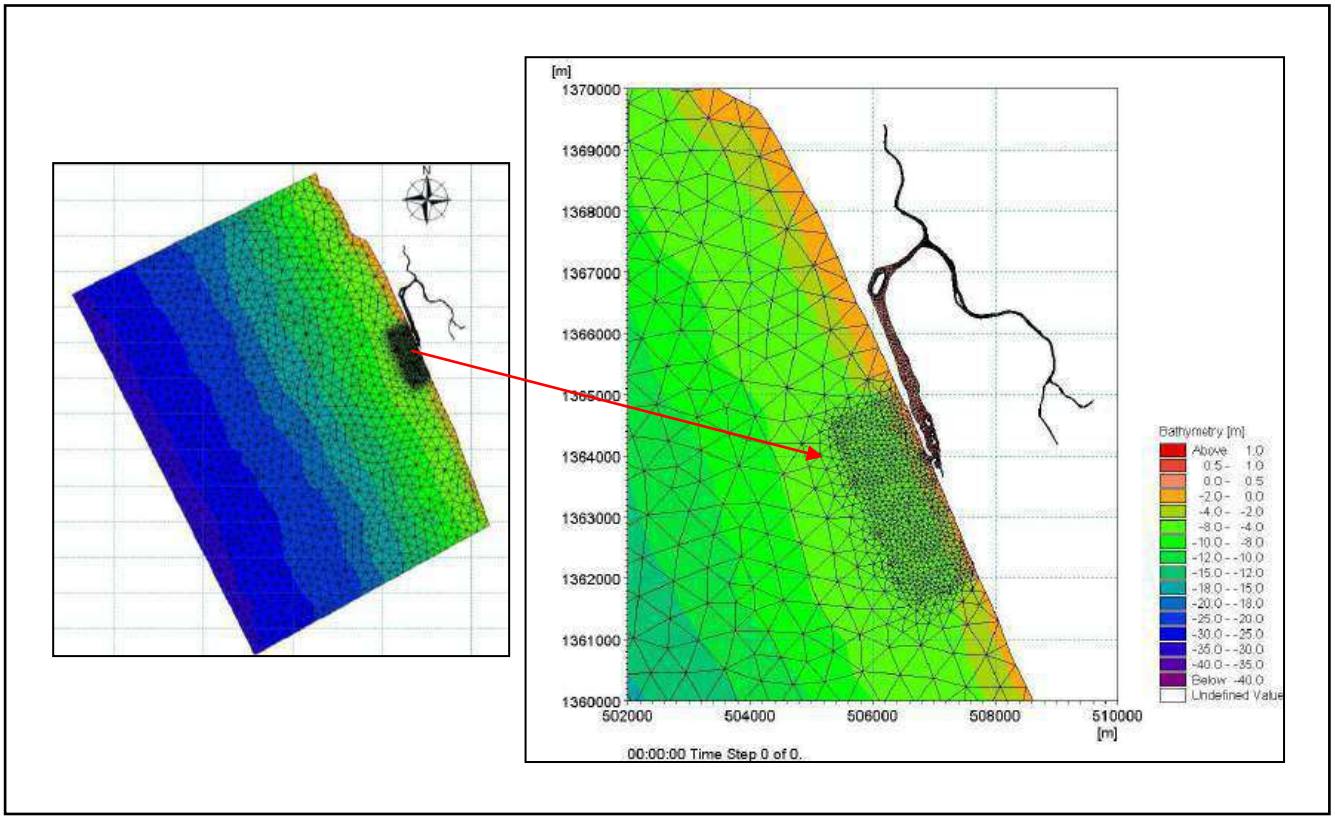


Figure 9: Computational mesh showing variable mesh resolution

6.2 Simulation of Flow Field – Existing condition- non-monsoon and monsoon seasons

Initially, flow field are modelled for the existing conditions for both non-monsoon and monsoon seasons. Defining boundary condition is essential for modelling the flow field. There are three offshore boundaries and one land boundary. The boundary tides are defined along these three offshore boundaries. The boundary tides obtained from MIKE 21 Global tidal model is used to define the boundary condition with phase lag. Further, discharge along the Chittari river is also given as another boundary condition. As the flow is assumed to be parallel to the contours along the western boundary, no-cross flux was considered in the west boundary in the open sea. Radiation stresses are also considered in the simulation to take into account the effect of wave induced currents. With these given forcings, MIKE 21 HD module is used to model the variation in tides and currents for a period of 15 days in non-monsoon (March 2023) and monsoon (July 2023) separately. The changes in flow fields are estimated every 30 minutes. Typical velocity vector plots during different phase of tides obtained during non-monsoon and monsoon seasons are shown from Fig. 10 to Fig. 13.

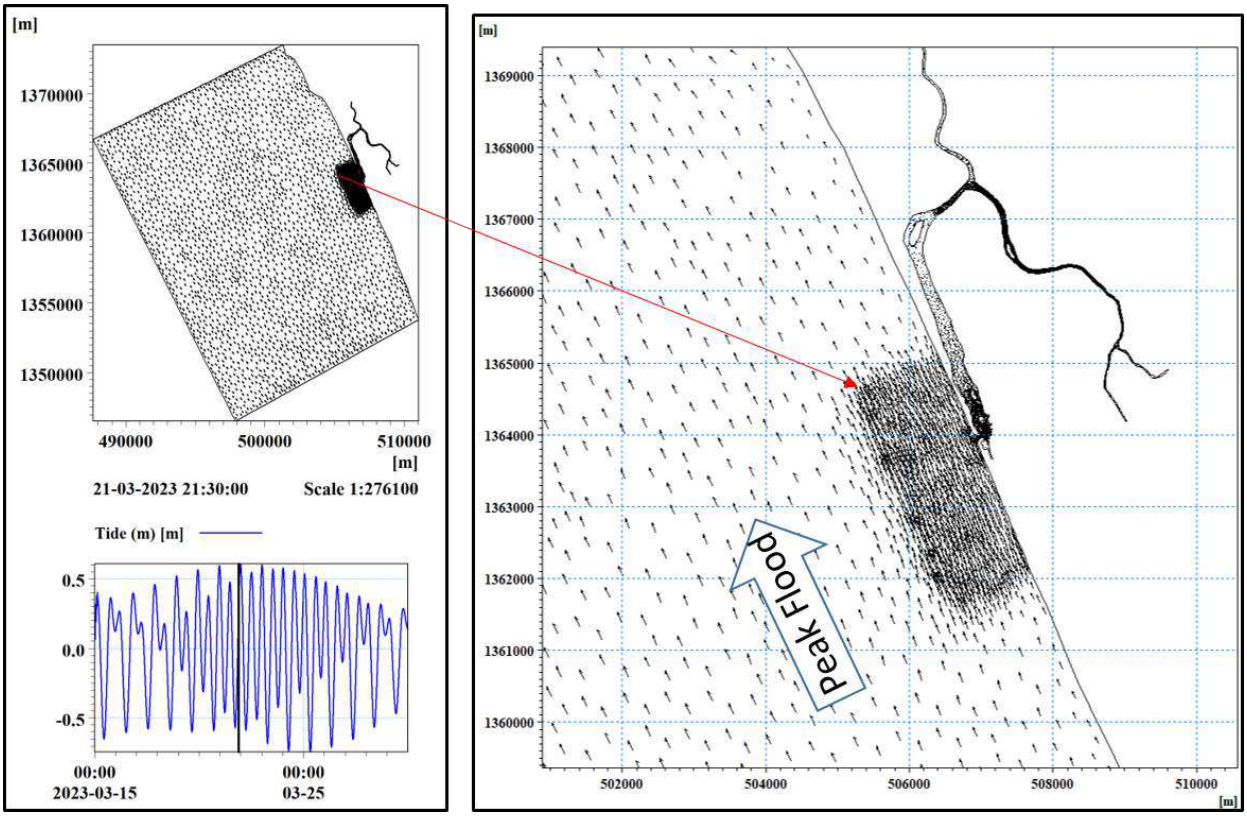


Figure 10: Flow field during peak flood-Non-monsoon season (Existing)

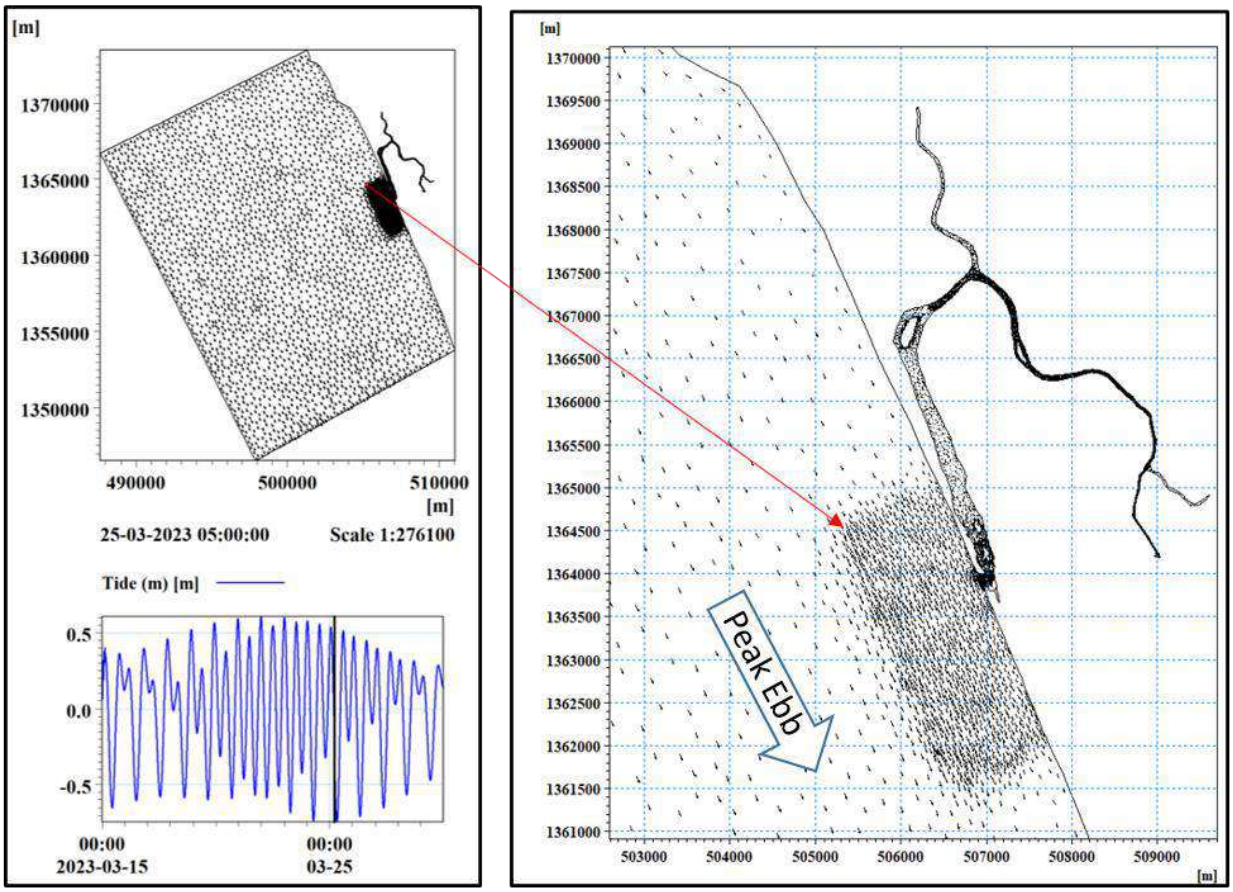


Figure 11: Flow field during peak ebb -Non-monsoon season (Existing)

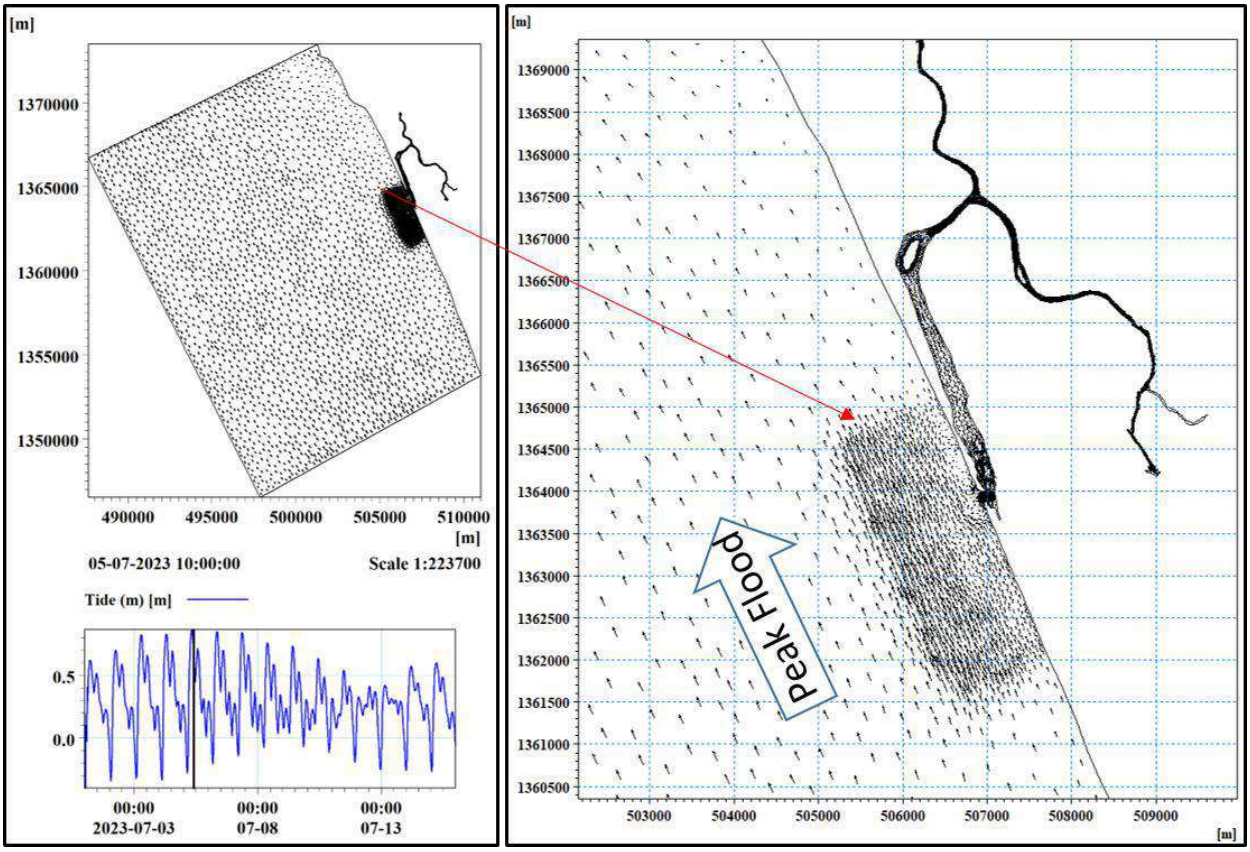


Figure 12: Flow field during peak flood- Monsoon season (Existing)

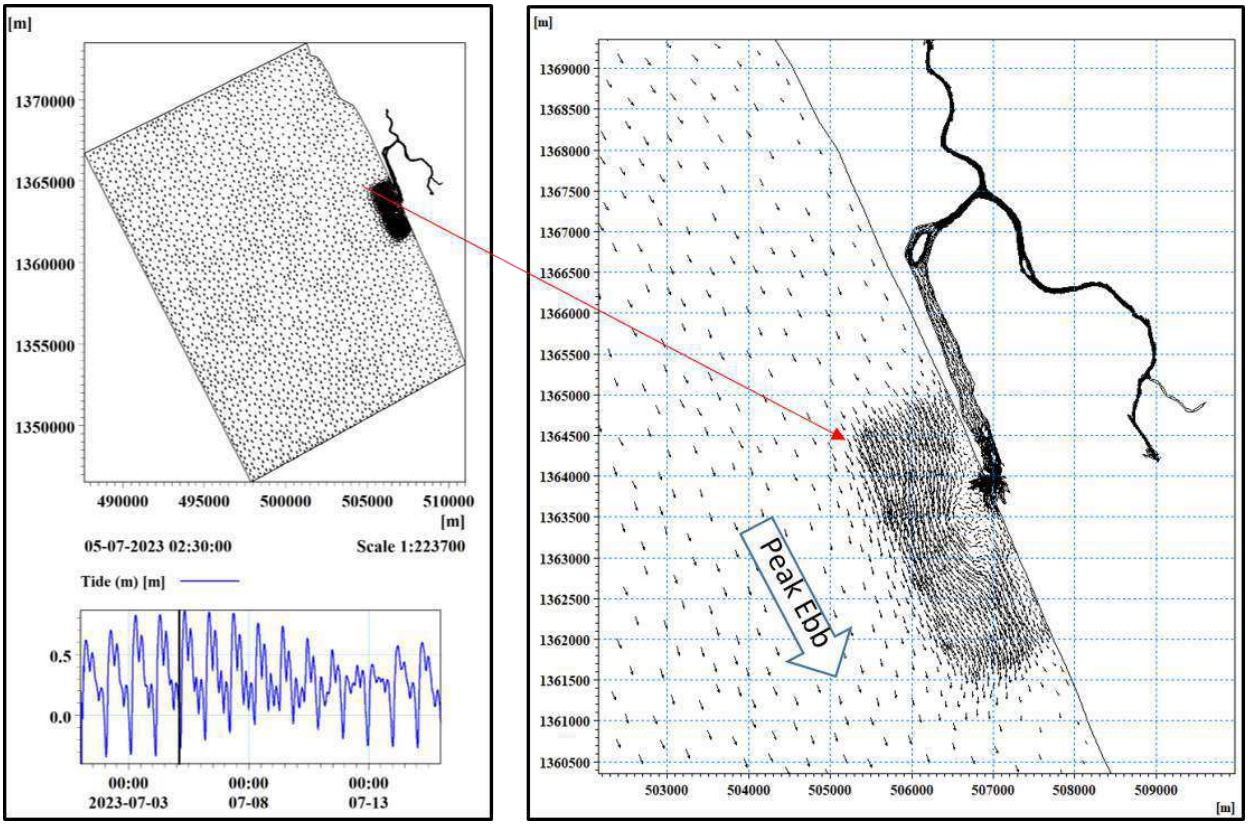


Figure 13: Flow field during peak ebb- Monsoon season (Existing)

The length of the vector gives magnitude of the current while the arrowhead shows the direction of flow. During peak flood, flow follows natural contour parallel to the coastal. The observed data of tides and current are provided at two points (P1 and P2) in the study area by the HED. Point P1 and Point P2 is located along the river and sea side of the computational domain respectively. The details of geographical location of P1 and P2 is discussed above in section 3. These two points are used for the purpose of comparison of modelled tides and currents against the observed values. The observed data of tides and currents at P1 and P2 are obtained during non-monsoon season only. The comparison of computed tides against the field values during non-monsoon season is shown in Fig. 14.

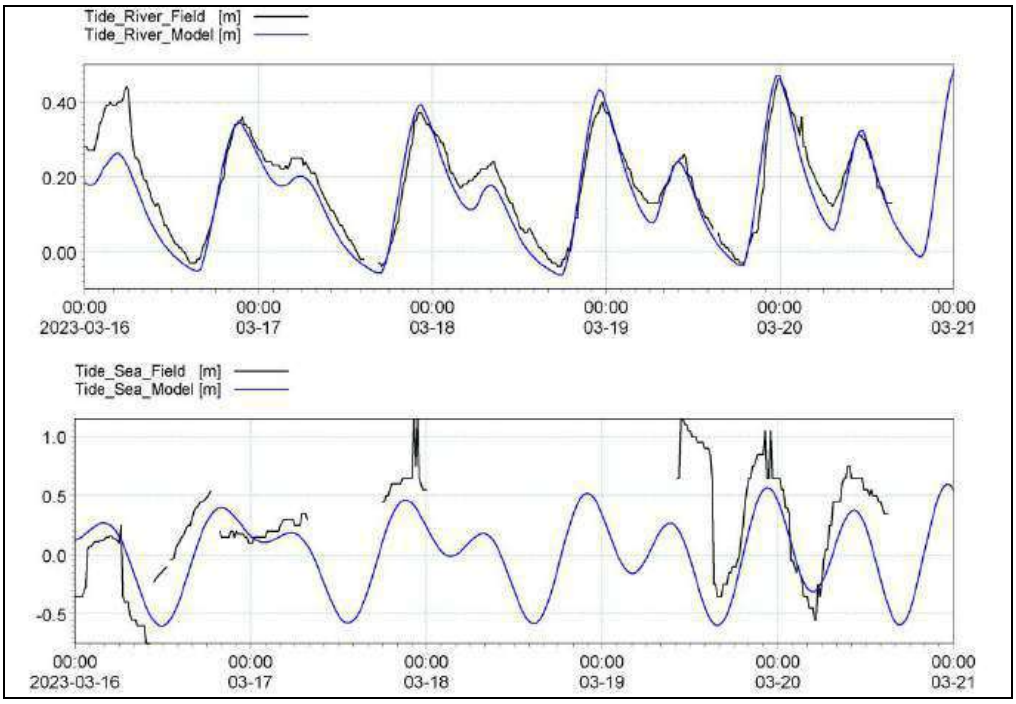


Figure 14: Comparison of tides (Field Vs Computed)

From the Fig.14, it is observed that there is good correspondence between the computed and field values of tides at the point P1. The good correspondence at P1 signifies the efficacy of model calibration. Due to the inherent ambiguity of the field current data at P1 and P2 provided by the PA, it is not possible to compare the computed values of currents at P1 and P2 against the field data. However, modelling results of currents shows that peak values of currents are captured more accurately by the model. Hence, there is good correspondence of computed peak current with the field peak currents. The peak of field current is 0.14m/s and peak of computed current obtained is 0.17m/s at P1. Similarly, at P2 peak of field current is 0.40m/s whereas peak of obtained computed current is 0.39m/s. The littoral drift and sediment pattern studies for the existing condition is discussed below

6.3 Littoral Drift Studies

Littoral drift studies are necessary for mapping the littoral distribution and changes in shoreline at the proposed location of fishing harbour. The littoral drift at this study area was carried out by CWPRS in the year 2016. The simulation results of the littoral studies were already reported vide Technical Report: - T.R. No. 5357 of 2016. The study reveal that annual southward and northward transports are 0.531Mm^3 and 0.118Mm^3 respectively with the net and gross transports being 0.413Mm^3 and 0.649Mm^3 respectively. Other findings of the study reveal that shoreline evolution in 10 years period will result in accretion on the northern side (68m in cross shore direction) and southern side (40m in cross-shore direction) of the proposed northern and southern breakwater respectively. This accretion and erosion is expected to extend further upto 2500m and 1500m towards along the shore towards north and south direction respectively. The shoreline evolution over the years for accretion and erosion is shown in Fig.15. Taking into consideration the influential role of silt and clay (mud) on sedimentation, in the present study, Mud Transport (MT) is modelled using MIKE 21 MT for identifying the spatially varying zones of sedimentation.

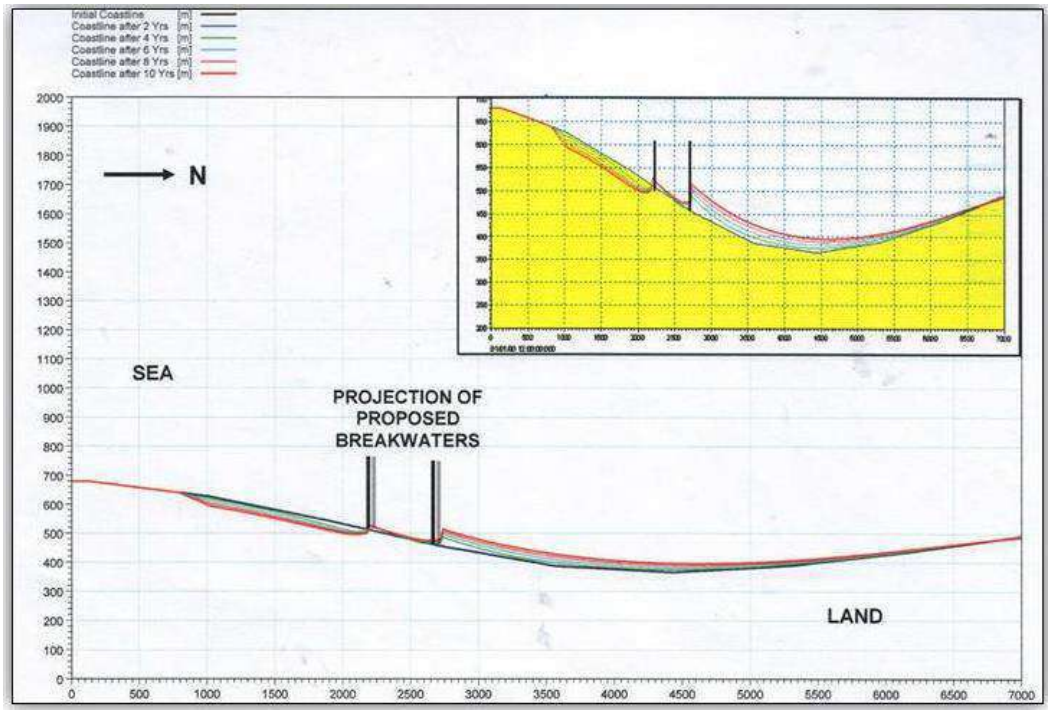


Figure 15: Shoreline evolution after 2nd,4th ,6th,8th and 10th year

6.4 Sedimentation Pattern - Existing Condition-non-monsoon and monsoon seasons

The sedimentation studies were carried out for the existing conditions for both non-monsoon and monsoon seasons using MIKE21 MT module. The results of hydrodynamic studies is one of the important inputs for sedimentation modelling using MIKE21 MT . Other inputs required are SSC and bed sample data in the study area. The data of SSC and bed sample are given by

HED for non-monsoon season. For monsoon season 50% increased SSC fraction of non-monsoon season is assumed to be adopted as input for sedimentation modelling. Using these inputs in the MIKE 21 MT model, sedimentation studies were carried out for the existing condition for a period of one month. The sedimentation patterns during non-monsoon and monsoon seasons are shown in Fig. 16 and Fig. 17 respectively. During monsoon period with the elevated discharge of Chittari River, flushing out of sediments deposited during non-monsoon period is observed. The estimated deposition (maximum) of about 0.1m in a year over the computational domain is obtained. The annual sedimentation estimated at the river mouth is about 0.021m for the existing condition.

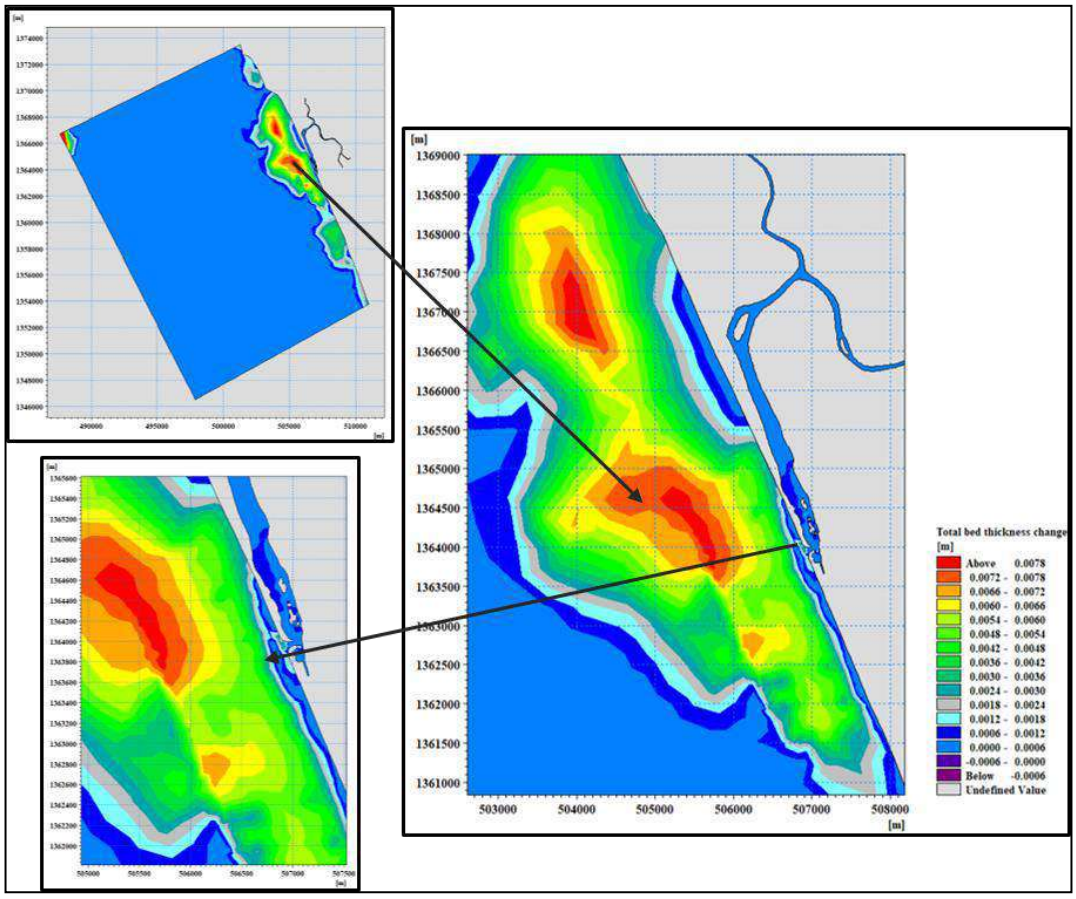


Figure 16: Sedimentation pattern during Non-monsoon season (Existing)

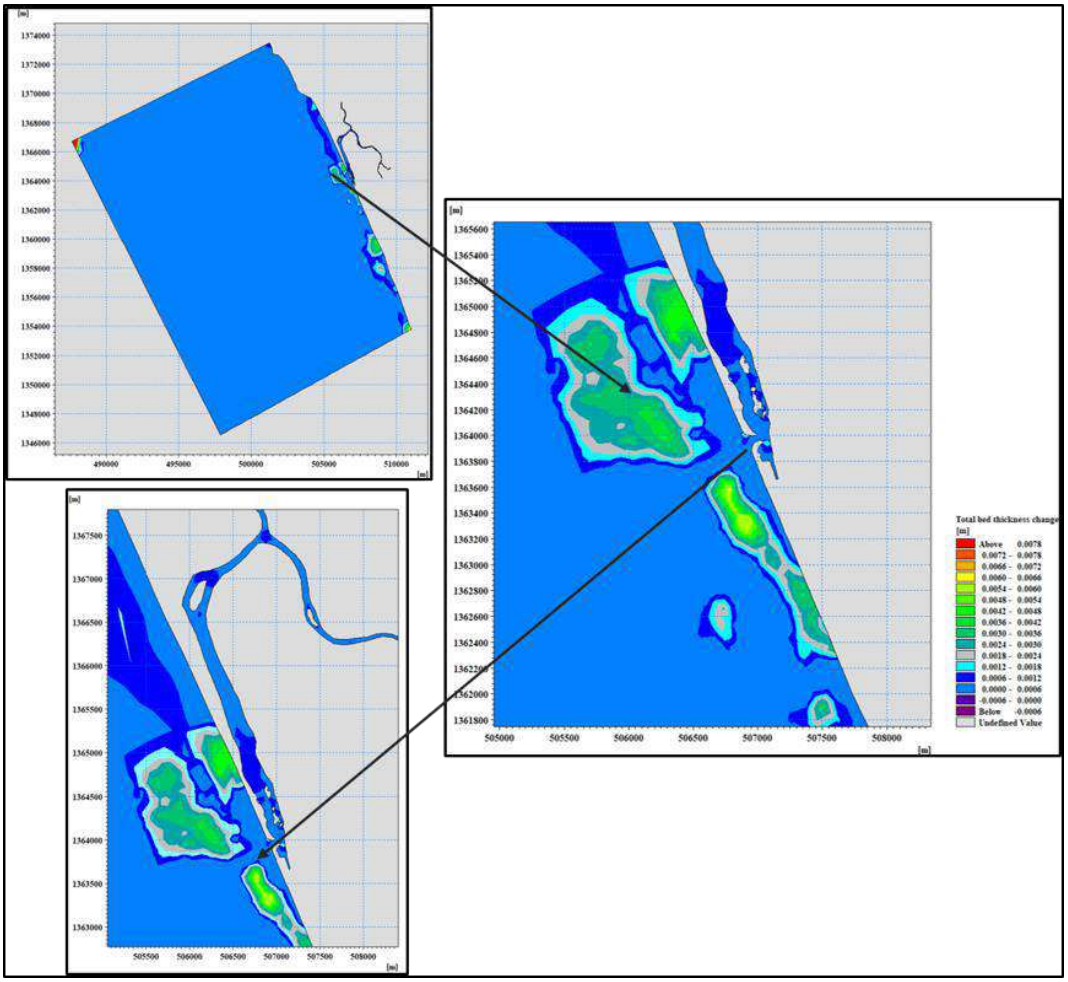


Figure 17: Sedimentation pattern during Monsoon season (Existing)

6.5 Simulation of Flow Field - Proposed Condition-non-monsoon and monsoon seasons

The calibrated model setup of existing condition was re-established by incorporating the features of the proposed layout. The layout consists of 1150m long north breakwater, 425m long south breakwater, 435m breakwater as a river training work & dredging (-2m) inside the approach channel nearer to the Chittari river mouth and suitable dredging along the river. The layout also consists of dredging of -4m inside the proposed fishing harbour. The bathymetry after re-establishing the proposed layout is shown in Fig. 18.

The computation domain with the unstructured mesh developed for the proposed layout is shown in Fig. 18. The mesh resolution considerations are the same as discussed in the section 6.1.

The flow is modelled during non-monsoon and monsoon seasons following the similar procedure and boundary condition constraints as adopted for simulating the flow conditions for the existing conditions. MIKE 21 HD module is again simulated to get the outputs of tides and currents for the proposed layout.

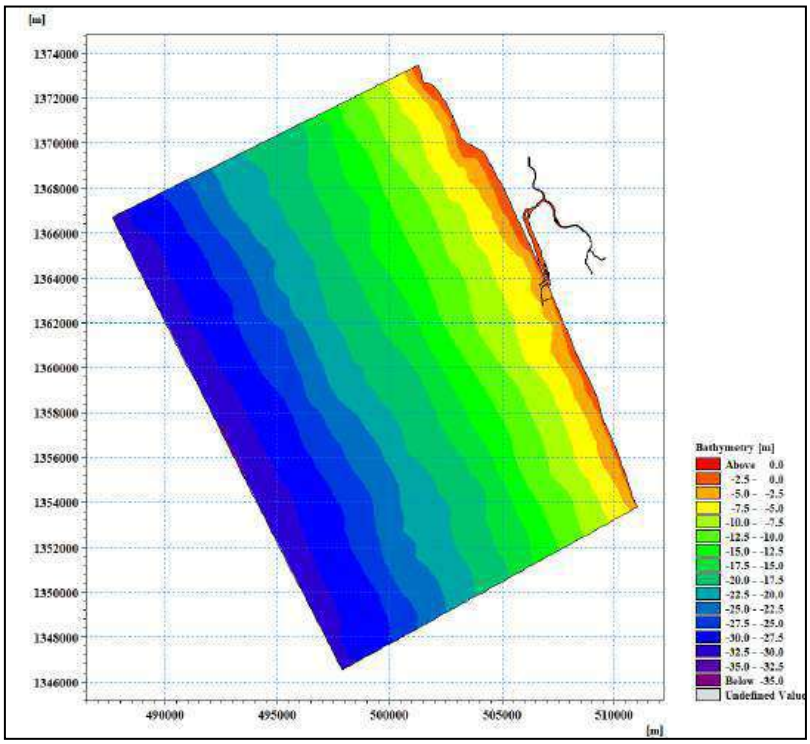


Figure 18: Bathymetry with proposed layout

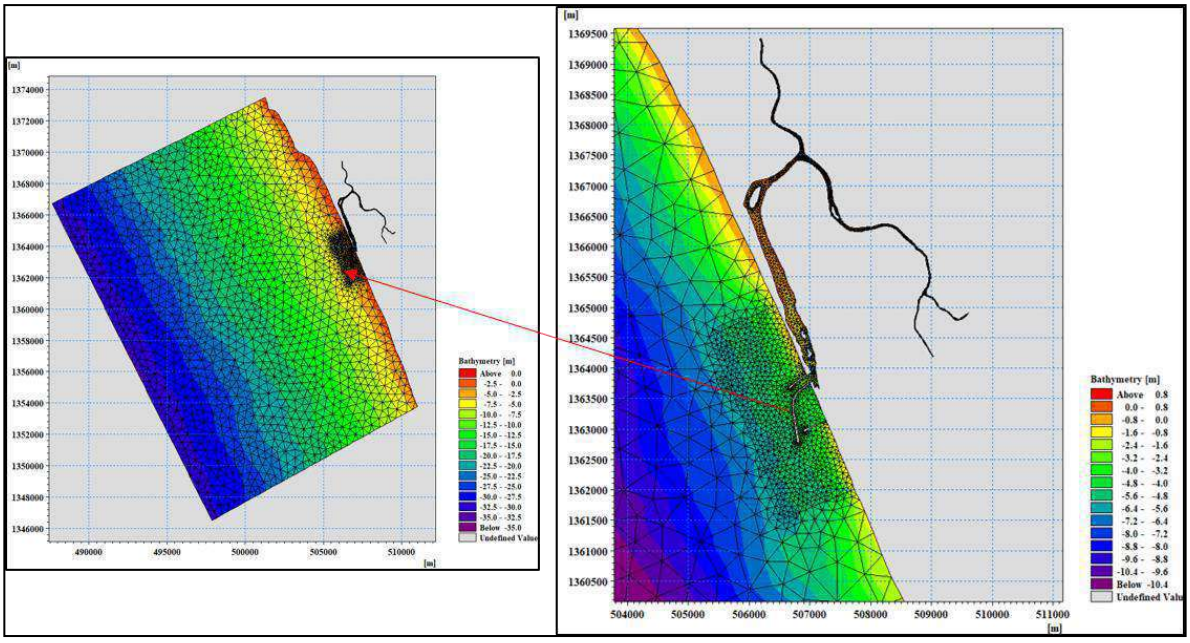


Figure 19: Computational domain for proposed layout

The flow fields along the model domain obtained for non-monsoon and monsoon seasons during peak flooding and ebbing tidal phases are shown from Fig. 20 to Fig. 23. During non-monsoon season, it is observed from the flow fields that circulation is formed near south breakwater during ebbing phase of tide. However, during monsoon season, circulation is formed near south breakwater (during flooding and ebbing phase of tide). In addition, during flooding phase, circulation is formed at 2 other locations (near north breakwater and entrance of river mouth) also. Though eddies formed around the circulation are weak, its intensity may

change according to changes in local climate. Furthermore, four points t1, t2, t3 and t4 called as monitoring stations are considered for assessment of changes in currents after construction of proposed layout. The locations of these four monitoring stations are shown in Fig. 24.

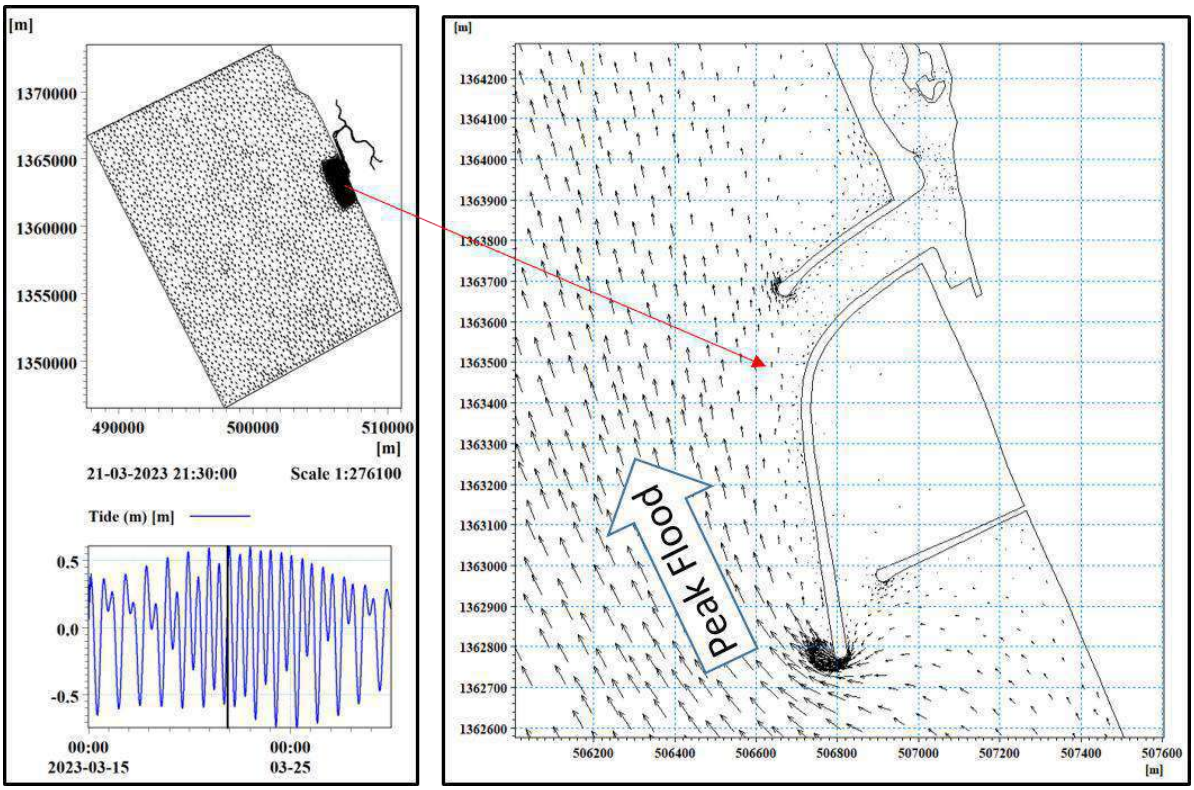


Figure 20: Flow field during peak flood-Non-monsoon season (Proposed condition)

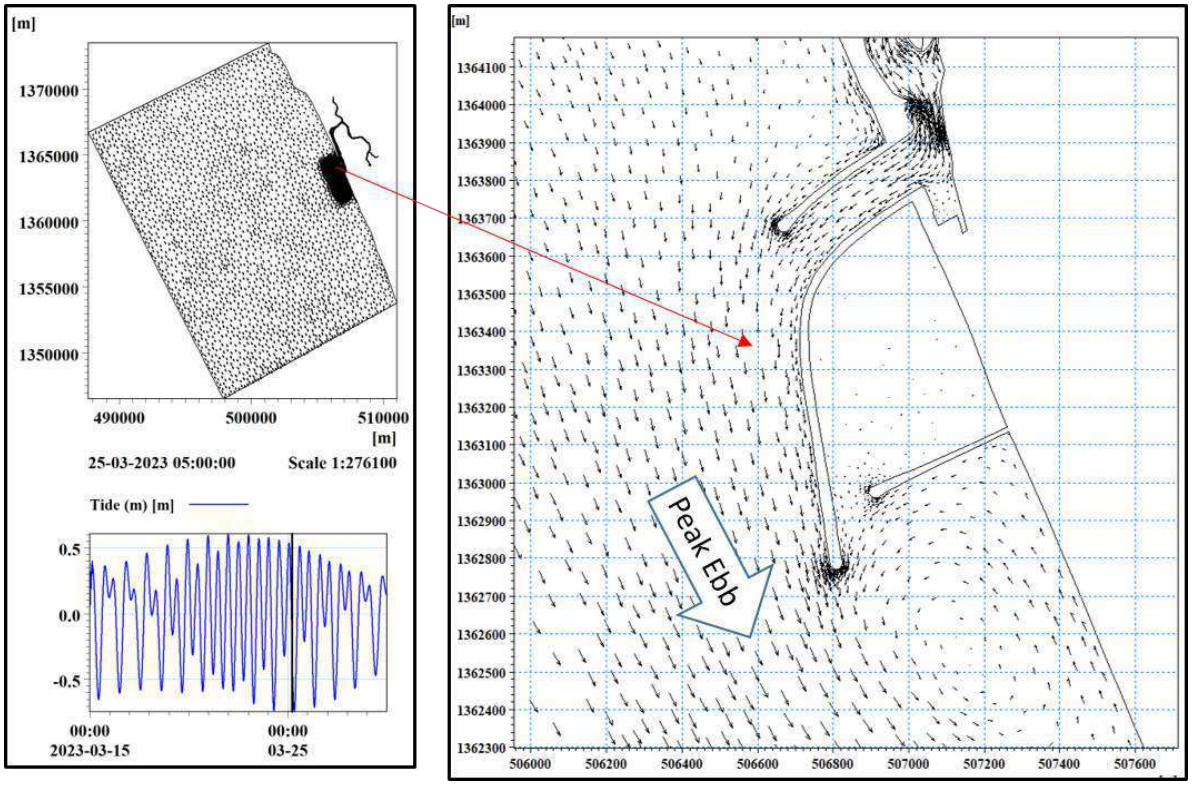


Figure 21: Flow field during peak ebb -Non-monsoon season (Proposed condition)

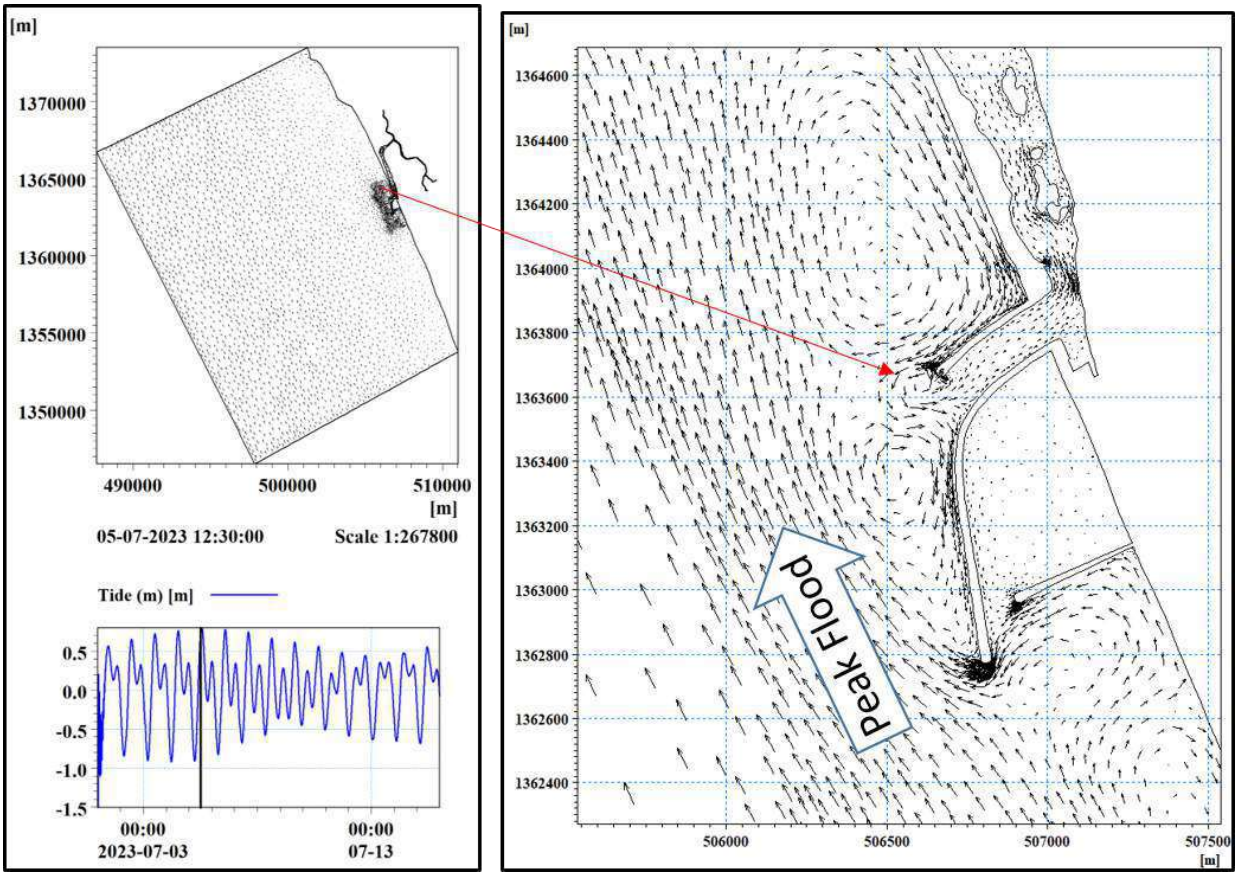


Figure 22: Flow field during peak flood- Monsoon season (Proposed condition)

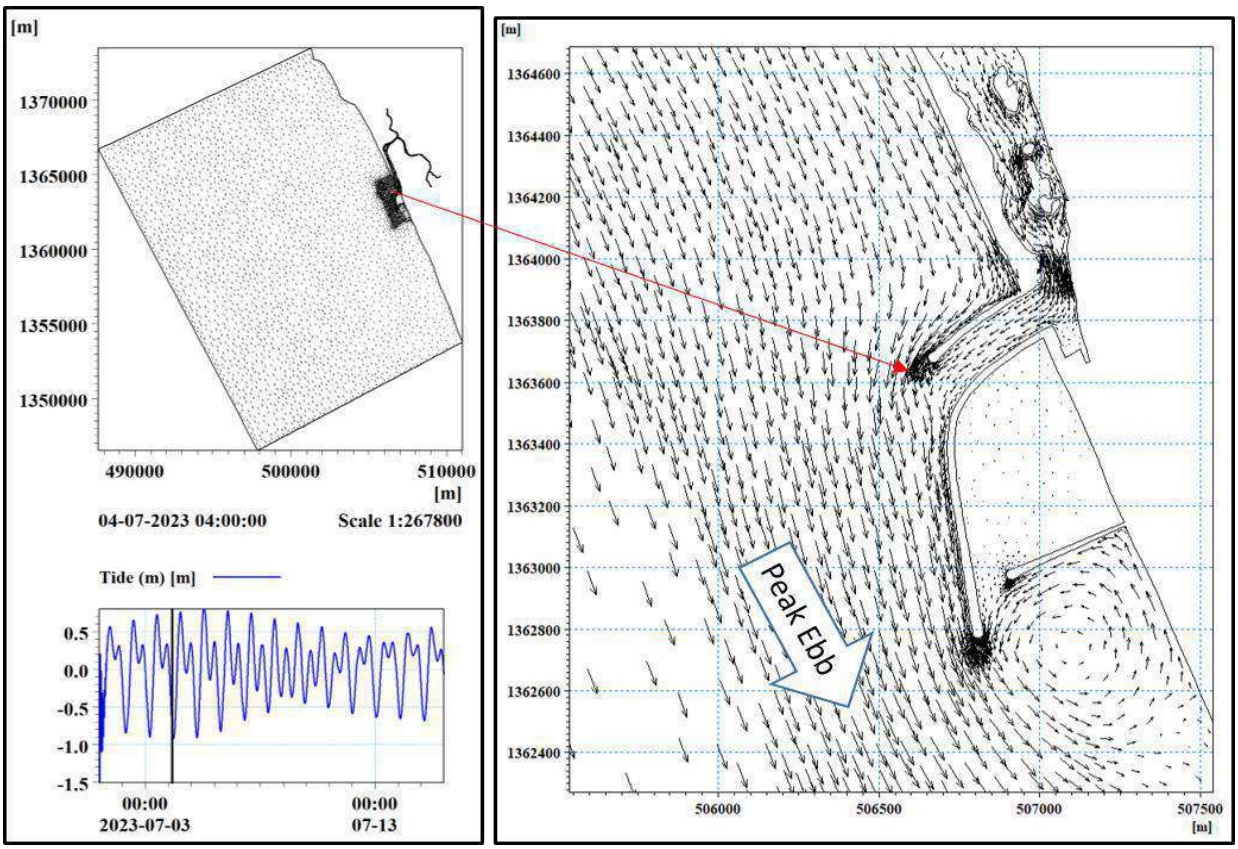


Figure 23: Flow field during peak ebb- Monsoon season (Proposed condition)

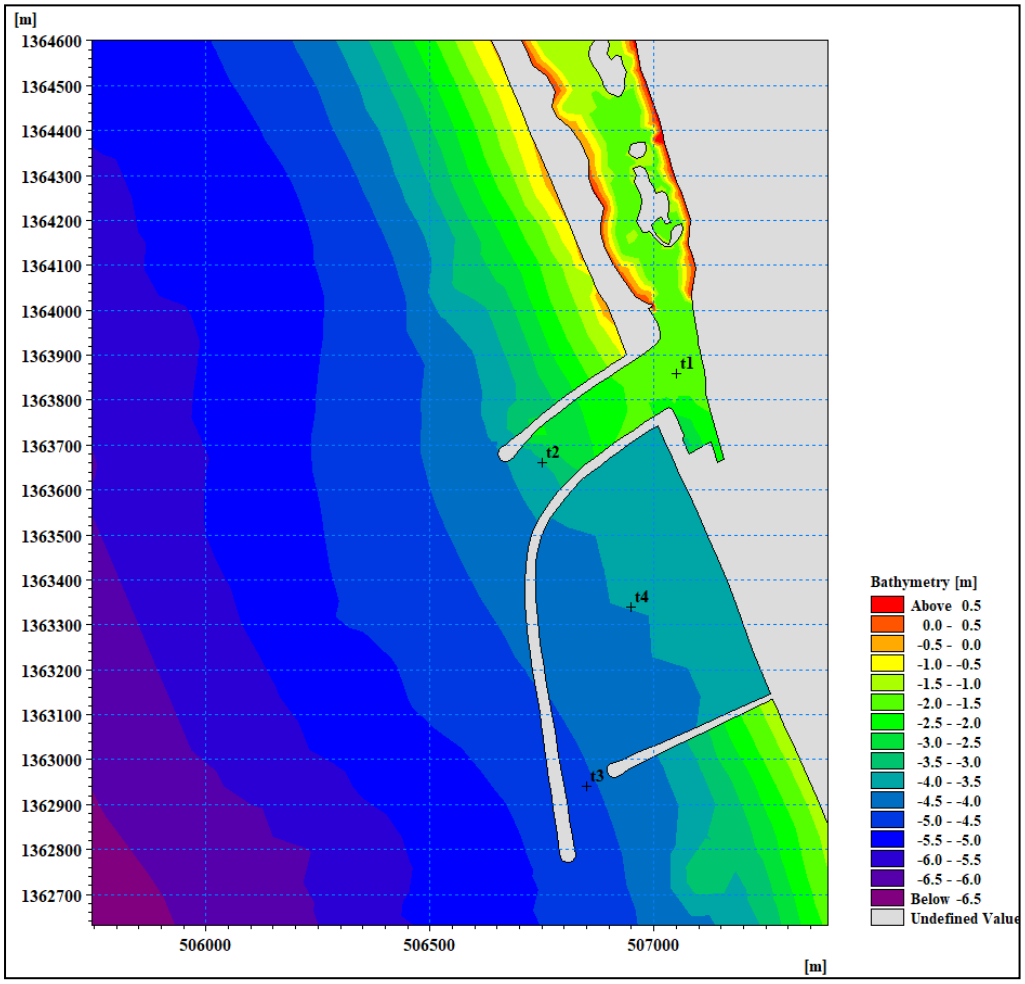


Figure 24: Details of proposed layout with monitoring stations

The computed currents during non-monsoon and monsoon period at all monitoring stations obtained for the proposed layout is compared against the computed currents at corresponding points for the existing condition. The comparison is shown in Fig. 25 and Fig. 26. It is observed from Fig. 25 and Fig. 26 that both during non-monsoon and monsoon season only at the monitoring station t1, there is increase in magnitude (from 0.007 m/s to 0.1m/s during non-monsoon and from 0.015m/s to 0.3m/s during monsoon season) of currents after the proposed construction work. At t2, t3 and t4, the magnitude of currents is significantly reduced after the proposed development. During non-monsoon season, the peak modelled currents at t2, t3 and t4 for existing condition are 0.43m/s, 0.38 m/s and 0.39 m/s respectively. After the proposed development the currents at these three monitoring stations are reduced to 0.11m/s, 0.06m/s and 0.008m/s. However, during monsoon season, at t2, t3 and t4 for existing conditions, the peak modelled currents are 0.55m/s, 0.46m/s and 0.49m/s respectively. The currents at t2, t3 and t4 are reduced to 0.21m/s, 0.11m/s and 0.003m/s after proposed development during monsoon season.

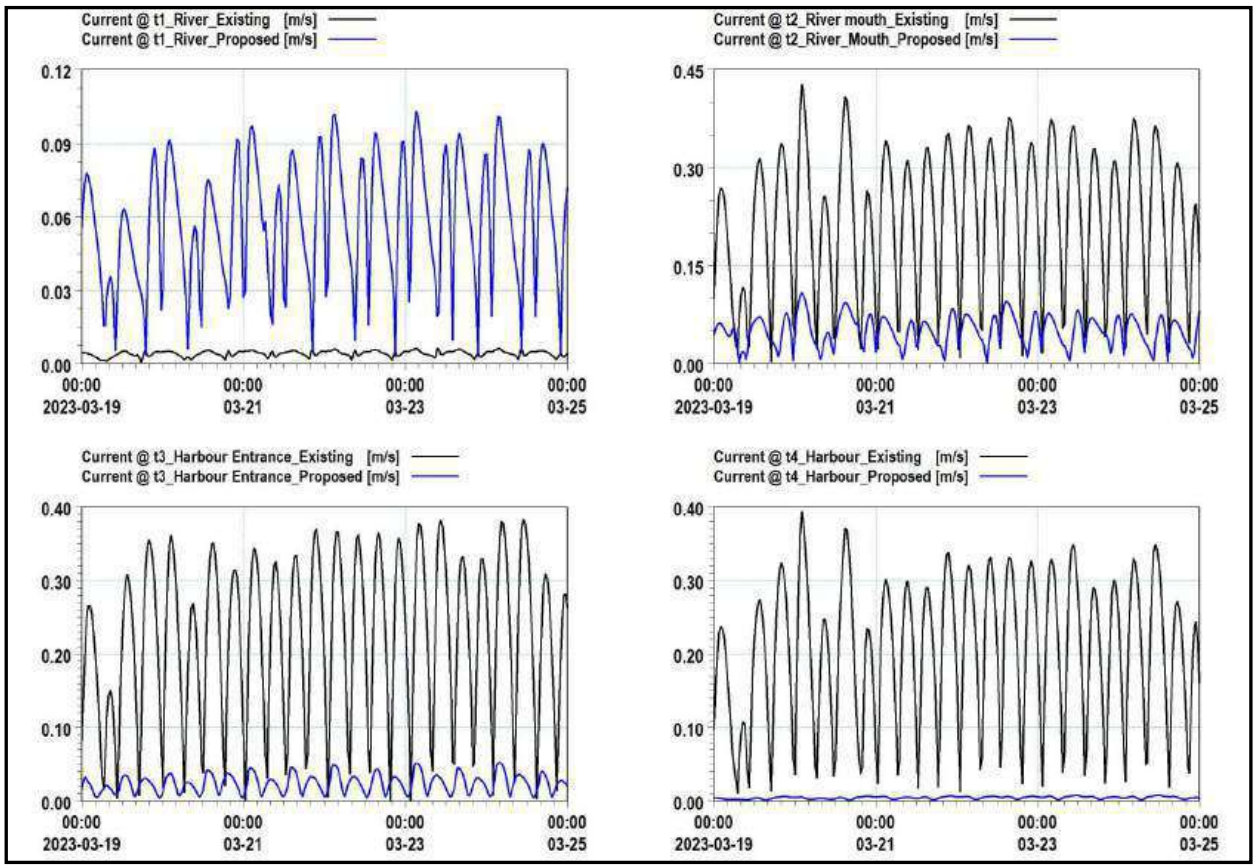


Figure 25: Currents at monitoring stations during Non-monsoon season
(Existing Vs Proposed condition)

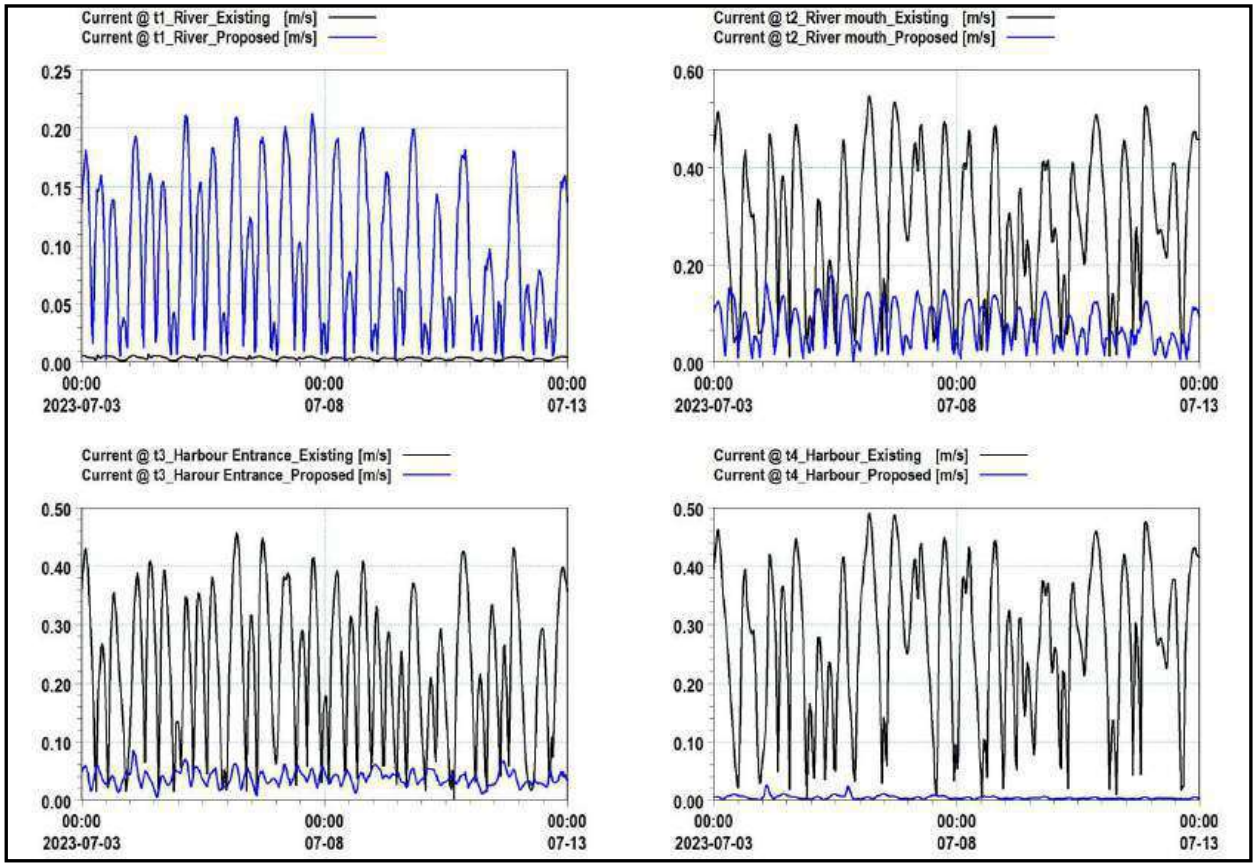


Figure 26: Currents at monitoring stations during Monsoon season
(Existing Vs Proposed condition)

6.6 Sedimentation Studies – Proposed condition- non-monsoon & monsoon seasons

The sedimentation studies were carried out for the proposed conditions for both non-monsoon and monsoon seasons by using MIKE 21 MT module over a period of one month. The sedimentation pattern during non-monsoon and monsoon seasons are shown in Fig. 27 and Fig. 28 respectively. During the monsoon season, there is slight increase in deposition (Fig. 28) at the river mouth and below the southern breakwater as compared to non-monsoon season. The annual sedimentation estimated in the Fishing Harbour is about 0.03m and at the North and South side of the proposed development annual sedimentation is estimated to be about 0.05m. The annual sedimentation estimated at the river mouth is about 0.045m for the proposed condition. The deposition of sediments near the north and south breakwater is majorly due to formation of circulation at these locations.

The sedimentation estimated is slightly higher in the river mouth region for the proposed condition as compared to the existing condition. The minor increase in sedimentation for the river mouth of proposed condition can be attributed to decrease in currents after establishing the proposed layout.

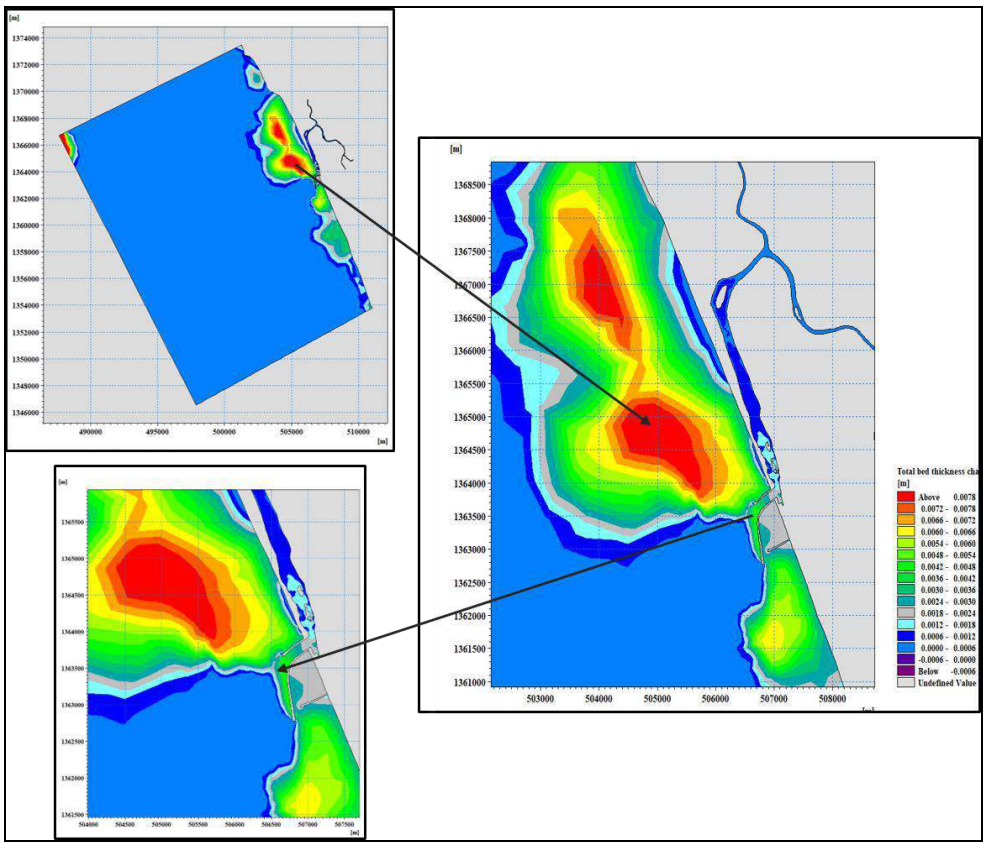


Figure 27: Sedimentation pattern during Non-monsoon season (Proposed)

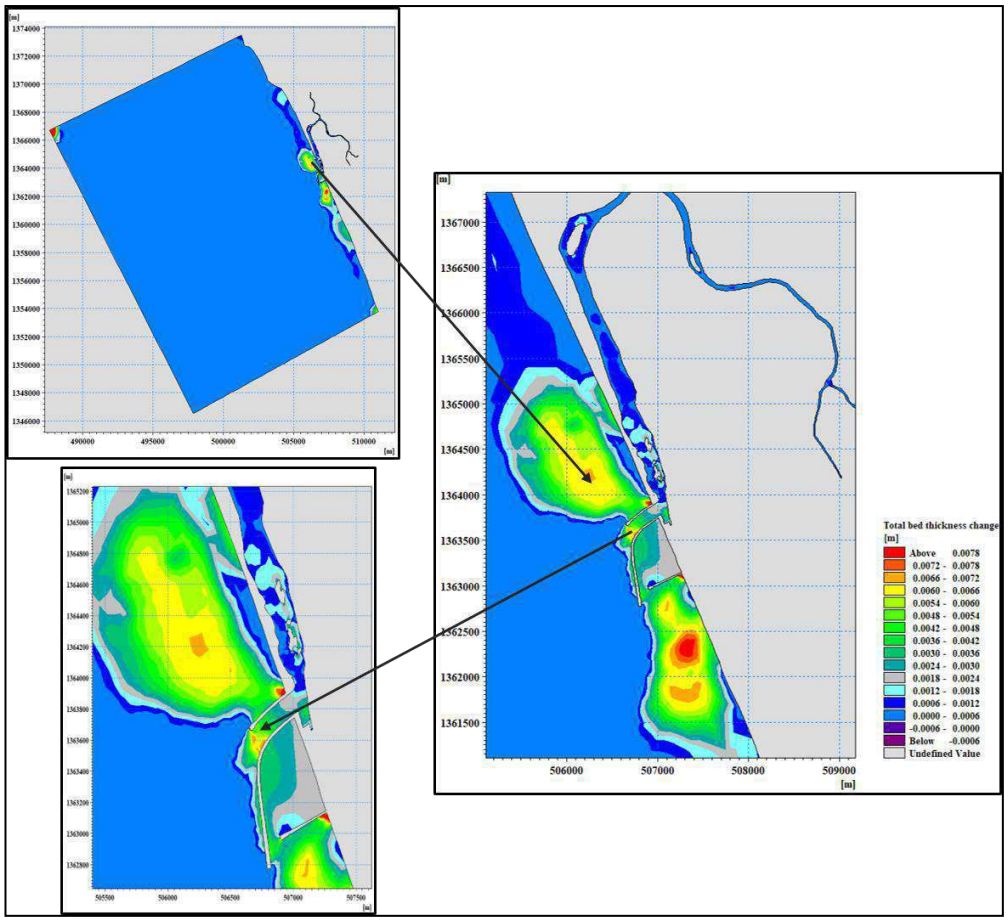


Figure 28: Sedimentation pattern during Monsoon season (Proposed)

6.7 Effect of Littoral Drift

Due to littoral drift, accretion and erosion are taking place on the north and south sides of the proposed development, respectively. The shoreline evolution after 10 years is predicted as accretion on the northern side extending up to 2500m along the shore and about 68m in cross-shore direction, and as erosion on the southern side extending up to 1500m along the shore and about 40m in cross-shore direction. It is observed that the shifting of the river mouth is about 200m towards the north over a year. If the shifting of the river mouth is pronounced after the proposed development of the river training works then a seawall of appropriate length may be provided to arrest the shifting of the river mouth. Similarly, if the erosion on the south side of the proposed fishing harbour is progressive after the development then a suitable shore protection measure in the form of a seawall or series of groynes may be provided.

7.0 CONCLUSIONS

The mathematical modelling studies for the proposed fishing harbour at Ajanur are undertaken. The simulations of hydrodynamics and sedimentation are performed for the existing conditions and for the proposed layout. Both non-monsoon and monsoon seasons are considered. The major conclusions of the study are given below:-

(i) In the existing condition, the hydrodynamic model results during non-monsoon season shows good calibration of the model with the field observed data.

(ii) The sedimentation studies for the existing condition shows some promising results of sedimentation pattern. Under the existing conditions, the estimated annual sedimentation i.e., depth of deposition is about 0.021m at the river mouth.

(iii) For the proposed development, due to dredging in the proposed area, modelling studies shows decrease in the currents in most of the area of study region (monitoring stations t2, t3 and t4) as compared to the existing condition.

(iv) The sedimentation pattern for the proposed condition shows sedimentation of the order of 0.045m per annum near the river mouth. Sedimentation is also noticed near the north and the south breakwaters (0.05 m in a year). In the fishing harbour area sedimentation of about 0.03 m in a year is estimated.

(v) If the erosion on the south side of the proposed fishing harbour is progressive after the development then a suitable shore protection measure in the form of a seawall or series of groynes may be provided.

(vi) If the shifting of the river mouth is pronounced after the proposed development of the river training works then a seawall of appropriate length may be provided to arrest the shifting of the river mouth.

(vii) The capital dredging in the fishing harbour area, in the river mouth and along the river is calculated to be about 1.1Mm^3. During the construction phase there are debris getting deposited in the dredged area. Therefore, this factor should also be considered for effective planning of construction. Also, maintenance dredging should be carried out near the river mouth and at the harbour entrance to maintain the desired depth for smooth movement of marine vessels.

(viii) The study suggest a proposed layout consisting of 1150m long north breakwater, 425m long south breakwater and 435m breakwater as a river training work near the mouth of Chittari river.

8.0 REFERENCES

1. CWPRS Technical Report No.5357, “Mathematical Model studies for littoral drift and shoreline evolution due to the proposed fishery harbour at Ajanur Dist. Kasargod, Kerala” (February 2016).
2. CWPRS Technical Report No.5436, “Wave propagation studies to determine wave climate for the development of fish landing facilities at Ajanur Dist. Kasargod, Kerala” (November 2016).
3. MIKE21- Flow Model FM, “User guide for Hydrodynamics module and Mud Transport Module”, Danish Hydraulic Institute (2014).

Annexure-I








Photographs at Ajanur Fishing Harbour

WAVE FLUME STUDY REPORT

भारत सरकार / GOVERNMENT OF INDIA
जल शक्ति मंत्रालय / MINISTRY OF JAL SHAKTI
जल संसाधन, नदी विकास और गंगा संरक्षण विभाग
DEPARTMENT OF WATER RESOURCES, RIVER DEVELOPMENT AND GANGA REJUVENATION
केंद्रीय जल एवं विद्युत अनुसंधान शाला
पुणे- 411024
CENTRAL WATER AND POWER RESEARCH STATION
PUNE – 411 024

तटीय अवरोध संरचना प्रभाग
COASTAL HYDRAULIC STRUCTURES DIVISION

तकनीकी रिपोर्ट संख्या :6177
नवम्बर, 2023

TECHNICAL REPORT NO :6177
NOVEMBER, 2023

केरल के कासारगोड जिले में स्थित अजानूर में मत्स्यन बंदरगाह के लिए तरंगरोधक के डिजाइन के लिए डेस्क और तरंग फ्लूम अध्ययन

DESK AND WAVE FLUME STUDIES FOR THE DESIGN OF BREAKWATER FOR FISHERY HARBOUR AT AJANUR IN KASARGOD DISTRICT, KERALA

Dr. R.S. Kankara
Director

REPORT DOCUMENTATION SHEET	
Technical Report No. 6177	**Date: NOVEMBER, 2023**
Title: DESK AND WAVE FLUME STUDIES FOR THE DESIGN OF BREAKWATER FOR FISHERY HARBOUR AT AJANUR IN KASARGOD DISTRICT, KERALA	
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Synopsis Harbour Engineering Department, Government of Kerala has a proposal to develop a fishing harbour at Ajanur. In view of this, Chief Engineer, Harbour Engineering Department, Govt of Kerala referred hydraulic model studies to CWPRS for the proposed fishing harbour at Ajanur. The studies were undertaken and the Mathematical Model Studies for wave tranquility at the proposed fishing harbour at Ajanur was carried out at CWPRS, Pune. Based on the Mathematical Model Studies, it was suggested to construct 1150 m long north breakwater and 425 m long south breakwater. Accordingly, desk & wave flume studies were conducted to evolve the cross-section of breakwater based on the actual site survey data and other hydraulic parameters. Design of breakwater with tetrapods in the armour was evolved based on the desk and wave flume studies. The design of breakwater at -4.50 m bed level consists of 6.0 t tetrapod in the seaside armour placed on 1:2 slope in double layer from el. +0.0 m to el. +7.0 m. A 7.0 m wide and 0.5 m thick crest slab with 0.5 m thick parapet wall is proposed at el. +8.5 m. The top of crest slab and parapet wall is kept at el. +7.0 m and +8.0 m respectively. A 6.0 m wide toe-berm is provided at el. +0.0 m consists of 2.0 t to 3.0 t stones with a sea side slope of 1:2. The hydraulic stability tests were conducted in the wave flume by reproducing the section to a Geometrically Similar (GS) model scale of 1:29. For the design of breakwater, water level of 2.60 m was considered as the Design Water Level (DWL), 1.40 m above the HWL (Storm Surge + Sea level rise). The significant wave height of 4.0 m was considered for the design of breakwater.	
Keywords Breakwater, Storm Surge, Armour, Tetrapod's, Toe-Berm etc.	

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1.0 INTRODUCTION

Ajanur village (Latitude 12.33° N and Longitude 75.18° E) in Kasargod District of Kerala is situated on the west coast of India, 15 km south of the district headquarter (Fig. 1). Harbour Engineering Department, Government of Kerala has a proposal to develop a fishing harbour at Ajanur. In view of this, Chief Engineer, Harbour Engineering Department, Govt of Kerala has referred hydraulic model studies to CWPRS for the proposed fishing harbour at Ajanur.

Based on these requirements, Mathematical Model Studies for wave tranquility for the proposed fishing harbour at Ajanur was carried out at CWPRS, Pune (Technical Report No. 5436 of Nov 2016). As per the layout no. 4 suggested in CWPRS Technical Report the harbour basin area comes out to be about 19 ha. Considering the suggestions given by the Technical Sanction committee of PMMSY schemes, Harbour Engineering Department proposed to increase the basin area upto 26 ha. Accordingly, Additional Mathematical Model Studies for wave tranquility (CWPRS Technical Note, July 2022) has been carried out for the proposed increased area. Based on the Mathematical Model Studies, it was suggested to construct 1150 m long north breakwater and 425 m long south breakwater.

Accordingly, desk studies were conducted for evolving the conceptual cross-section of the breakwater using empirical methods and past experience of CWPRS and considering the hydraulic/site conditions such as bathymetry, tides and waves prevailing at site. Thereafter, the wave flume studies were conducted for assessing the hydraulic stability of the proposed breakwater cross-section at Ajanur, Dist. Kasargod, Kerala.

This report describes in detail the desk & the wave flume studies carried out to evolve design of the breakwater for achieving tranquil condition in the proposed fishing harbour at Ajanur, Kerala.

3.0 SCOPE OF STUDIES

For the proposed development of fishery harbour at Ajanur in Kasargod district of Kerala, the following hydraulic model studies entrusted to CWPRS by Chief Engineer, Harbour Engineering Department, Thiruvananthapuram:

1. Additional Mathematical Model Studies for wave tranquility for the revised layout of fishery harbour at Ajanur, Kerala.
2. Desk and wave flume studies for the design of breakwater for fishery harbour at Ajanur in Kasargod district, Kerala.

On the basis of Mathematical Model Studies for wave tranquility for the proposed fishery harbour at Ajanur, 1150 m long north breakwater and 425 m long south breakwater are suggested as shown in Fig. 2.

The scope of the present studies includes evolving the conceptual design for the suggested breakwater based on empirical methods and the conditions prevailing at the site. Further, the conceptual design of the breakwater was assessed for its hydraulic stability by conducting wave flume tests for various design wave conditions.

3.0 SITE CONDITIONS

Ajanur village in Kasargod District is situated about 15km south of district headquarter at Latitude 12.33° N and Longitude 75.18° E in Kerala state. Majority of village population belongs to fishermen community. At present, the fishermen are operating their boats in open sea & they are facing difficulties in navigating the vessels due to shallow depth & direct wave action.

In view of this, Harbour Engineering Department, Govt of Kerala has a proposal to construct a fishery harbour south of the Chittari River mouth at Ajanur in Kasargod district, Kerala.

4.0 DESIGN CONDITIONS

4.1 Tidal Levels

The tides in the region are semidiurnal in nature. The maximum tidal range at Kasargod is about 1.0 m. The tidal currents are generally parallel to the coastline. The following tidal levels at Kasargod have been considered for the wave flume studies (Reference: Admiralty Chart No. 217 of 2019):

Table 1: Normal Tidal Levels at Kasargod, Kerala

Tides	Level w.r.t Chart Datum
Mean Higher High Water (MHHW/HWL)	+1.40 m
Mean Lower High Water (MLHW)	+1.30 m
Mean Sea Level (MSL)	+1.00 m
Mean Higher Low Water (MHLW)	+0.90 m
Mean Lower Low Water (MLLW/LLWL)	+0.40 m

A Design Water Level (DWL) of 2.60 m was considered including MHHW and 1.20 m above the MHHW i.e Storm Surge (0.80 m) + Sea level rise (0.40 m). These water levels are with respect to Chart Datum (CD). The design of breakwater cross-sections was also tested at HWL, MSL and LLWL water levels.

4.2 Design Wave Conditions

The predominant wave direction at proposed site in Kasargod district is SSW. Following design conditions were considered for the stability of the breakwater against wave attack and to provide tranquil condition in the harbour area:

1. Zero-order (0 to 1 %) damage for the significant wave height of 4.0 m at +2.60 m (DWL) and +1.40 m (HWL).
2. Overtopping is not permitted.
3. The wave periods considered for the tests are 8, 10 and 12 seconds.
4. The stability of the section is also to be assessed at an intermediate water level and low water level.

5.0 DESIGN OF BREAKWATER

The desk and wave flume studies have been conducted for evolving cross-section of the breakwater with tetrapods in the armour layer based on empirical formulae, existing conditions at the site and previous in-house extensive wave flume studies conducted at CWPRS for hydraulic stability of breakwater. The weight of armour units are basically evaluated based on Hudson's formula (as given below):

$$W = \frac{w_r H_b^3}{K_D \times (Sr-1)^3 \cdot \cot\theta}$$

Where,

H_b = Breaking wave height (m)
W = Weight of Armour (t)
w_r = Unit Weight of Armour (t/m^3)
K_D = Stability Coefficient for Breaking Wave Height
S$_r$ = Specific Gravity of Armour relative to Water at the structure (w_r / W_w)
W_w = Unit wt. of sea water (t/m^3)
Cot θ = Slope of armour

The conceptual design cross-section of the breakwater with tetrapods in the armour were evolved based on the desk studies as shown in Fig. 4. The design of breakwater at -4.50 m bed level consists of 6.0 t tetrapod in the seaside armour placed on 1:2 slope in double layer from el. +0.0 m to el. +7.0 m. A 7.0 m wide crest slab with 0.5 m thick parapet wall is proposed with top el. +7.0 m. The top of parapet wall is kept at el. +8.0 m. A 6.0 m wide toe-berm is provided at el. +0.0 m consists of 2.0 t to 3.0 t stones with a sea side slope of 1:2. Secondary layer consists of 0.5 – 1.0 t stones below the armour layer and 200 – 300 kg stones below the toe-berm armour. A 0.30 m thick bedding layer consisting of stones up to 20 kg is provided at -4.50 m bed level.

6.0 HYDRAULIC MODEL STUDIES

6.1 Random Sea Wave Flume

The random sea wave flume having dimensions 90 m (length) x 2 m (width) x 1.50 m (height) was utilised for the wave flume tests as shown in Annexure-I / Photo 1. The system is capable of generating maximum wave height

of 0.4 m at a water depth of 0.6 m for wave periods ranging between 0.3 and 3 sec. The flume facility is equipped with a fully automated computerised random wave generating system comprising of computer, hydro-servo system and wave board assembly. The command signals are sent by computer to the servo-valve through which pressurised oil supplied by hydraulic power pack flows into the actuator. A *To* and *Fro* motion of the piston drives the wave board, which in turn generates waves in the flume.

6.2 Wave Measurement and Calibration

The wave heights were measured by capacitance type wave probes. A gauge was fixed in front of the model and was analysed by computer. The desired wave conditions in front of the model were obtained by matching of desired spectrum and achieved spectrum by iterative procedure.

6.3 Wave Flume Test Procedure

The cross-section of the breakwater was tested under a normal attack of waves in a 2-D wave flume for its hydraulic stability (Photo 1). The model of breakwater cross-section was constructed to a Geometrically Similar (GS) scale in the wave flume. The dimensions of the random wave flume are 90 m length, 2 m width and 1.5 m depth wherein both regular as well as random waves of desired wave height/wave period and desired standard wave spectrum respectively can be generated. Before starting the test, the number of tetrapods provided in the armour and stones in the toe-berm were counted. After conducting the tests for one-hour duration, the number of tetrapods/stones, if any, displaced from its original position were recorded and percentage of damage to the armour/toe-berm of breakwater was determined. During the test, the extent of splashing/overtopping over the crest was also recorded. The damage is expressed as percentage of number of tetrapods/stones displaced from their position. The percentage of damage is equal to "Number of units displaced/total no. of units used in the respective layer".

6.4 Model Scale

The model tests for design of cross-section of the breakwater were conducted in 2-D wave flume by reproducing the section to a Geometrically Similar scale of 1:29. The model was based on Froude's criterion of similitude. Various scales obtained are as follows:

Table 2: Scale Ratio for Model Studies of the Breakwater

Model scale 1:29		
Length	$-L$	= 1:29
Area	$-L^2$	= 1:841
Volume	$-L^3$	= 1:24389
Time	$-L^{1/2}$	= 1:5.385
Velocity	$-L^{1/2}$	= 1:5.385

6.5 Gradation of Stones

Details of various gradations of stones in prototype of the trunk of the breakwater and those used in the model having scale 1:29 are given table 3:

Table 3: Gradation of Stones for Trunk of Breakwater

Prototype		Model (Scale 1:29)	
Average	**Gradation**	**Average**	**Gradation**
2.5 t	2 – 3 t	100 gm	80 to 120 gm
1.5 t	1 – 2 t	60 gm	40 to 80 gm
0.75 t	0.5 – 1 t	30 gm	20 to 40 gm
250 kg	200 – 300 kg	10 gm	8 to 12 gm

6.6 2-D Wave Flume Tests

The cross section of the breakwater, as shown in Fig. 4, was constructed with a Geometrically Similar model scale of 1:29 in the wave flume. Tests were conducted considering both random and regular wave conditions to assess the stability of the breakwater. For random waves, 4.0 m significant wave height (H_s) was considered. To achieve this H_s, Pierson-Moskowitz (PM) spectrum was used for acquiring desired wave height in the 90 m wave flume. For acquiring desired

regular wave height i.e. non breaking wave height in front of the breakwater, series of wave height analysis was carried out with the help of in-house computer program.

The tests were carried out at CWL, MHHW, MSL & MLWL with various wave conditions. The tests were conducted for one-hour duration each in the model corresponding to about 5.39 hours (approx.) in the prototype. The objectives of the tests were to check hydraulic stability of the breakwater against various wave conditions likely to occur in the vicinity of proposed fishery harbour area at Ajanur, Kasargod district.

The details of the wave flume tests were conducted for breakwater cross-section at -4.50 m bed level with random waves are described as follows:

1) Initially, a test was conducted with random waves at a significant wave height (H_s) of 4.05 m at Design Water Level (+2.60 m) for one hour duration (corresponding to 5.39 hours in prototype) using PM (Pierson-Moskowitz) spectrum. There was no overtopping and moderate splashing observed during the test. The test showed that there was no damage occurred to both armour layer and toe-berm (Photograph No. 2).

2) An endurance test was conducted at Design Water Level (+2.60 m) with random waves using PM (Pierson-Moskowitz) spectrum for the significant wave height of 4.85 m (120% of H_s i.e. 4.80 m) for one hour duration. During the test, it was observed that there was moderate splashing but no overtopping. After conducting the test for one hour duration, no damage was observed in the armour and the toe-berm (Photograph No. 3).

3) Further, a test was conducted with random waves at a significant wave height (H_s) of 4.0 m at the Mean Higher High Water (MHHW) (+1.40 m) for one hour duration using PM (Pierson-Moskowitz) spectrum. There was no splashing and no overtopping observed during the test. After the test, it was observed that there was no damage occurred in the armour as well as in the toe-berm (Photograph No. 4).

4) Another test was conducted with random waves at a significant wave height (H_s) of 3.97 m at Mean Sea Level (+1.00 m) for one hour duration (corresponding to 5.39 hours in prototype) using PM (Pierson-Moskowitz) spectrum. During the test, no splashing and no overtopping was observed. There was no damage to the toe-berm as well as to the armour observed after the test (Photograph No. 5).

5) A test was conducted with random waves at a significant wave height (H_s) of 3.76 m at Mean Lower Low Water Level (+0.40 m) for one hour duration (corresponding to 5.39 hours in prototype) using PM (Pierson-Moskowitz) spectrum. No splashing and no overtopping were observed during the test. After the test, it was observed that there was no damage to the toe- berm as well as to the armour (Photograph No. 6).

From the past experiences during the model testing, it has been revealed that many-times the structures were also susceptible to undergone damages during the regular wave conditions, therefore the cross-section of breakwater was also tested in the regular wave conditions.

The details of **regular wave testing** on the breakwater cross-section are as follows:

6) A test was conducted, at the Design Water Level of +2.60 m under the attack of regular waves of 10 sec period with wave height ($H_{1/3}$) of 5.0 m. There was minor overtopping and moderate splashing of waves observed during the test. The maximum wave run-up was upto +5.85 m and run-down was up to +0.72 m were observed. After conducting the test under the condition for one hour in the wave flume, no damage was observed in the armour layer and in the toe-berm (Photograph No. 7).

7) A test was also carried out under the attack of regular (monochromatic) waves at Mean Higher High Water (+1.40 m). The duration of test was one hour in the model corresponding to about 5.39 hours in the prototype. The test was conducted for wave height of ($H_{1/3}$) of 5.12 m with 12 second period. During the test, it was noticed that the maximum wave run-up was upto +9.0 m and run-down was up to +0.15 m. There

was no damage observed to the toe-berm stones and to the armour layer after the test. There was no splashing and no overtopping of waves observed (Photograph No. 8).

8) Further, a test was conducted for one hour duration at Mean Higher High Water (MHHW) of +1.40 m under the attack of regular waves of 10 sec period with wave height (H_{10}) of 5.0 m. During the test, no overtopping and no splashing was observed. The maximum wave run-up was upto +5.10 m and run-down was up to [-] 0.20 m. No damage was observed in the armour layer and in the toe-berm (Photograph No. 9).

9) Another test was conducted for one hour duration at Mean Higher High Water (MHHW) of +1.40 m under the attack of regular waves of 8 sec period with wave height (H_{10}) of 5.0 m. During the test, no splashing and no overtopping was observed. The max wave run-up was up to +4.25 m and run-down up to +0.00 m were observed. After conducting the test, there was no damage observed in the armour layer and toe-berm (Photograph No. 10).

10) A test was also carried out under the attack of regular (monochromatic) waves at Mean Sea Level (+1.00 m). The duration of test was one hour in the model corresponding to about 5.39 hours in the prototype. The test was conducted for wave height of 5.07 m (H_{10}) with 10 second period. During the test, it was observed that the maximum wave run-up and run-down was up to +3.50 m and up to (-) 0.50 m respectively. There was no damage observed in the toe-berm as well in the armour. No splashing and no overtopping of waves were observed (Photograph No. 11).

11) Another test was conducted for one hour duration at Mean Lower Low Water Level (MLLW) of +0.40 m under the attack of regular waves of 10 sec period with wave height (H_s) of 4.80 m. During the test, no splashing and no overtopping was observed. The max wave run-up was up to +3.50 m and run-down up to (-) 1.10 m were observed. After conducting

the test, there was no damage observed in the armour layer and toe-berm (Photograph No. 12).

All results of tests conducted for the cross-section of the breakwater (trunk portion) are summarized in the Table 4, and photographs of all the tests are enclosed as Annexure-V.

Overall, the cross-section of the breakwater was found stable against the higher wave action at high water level. No damage to the toe-berm and to the armour layer of breakwater were observed during the tests. Therefore, the section was found to be hydraulically stable against the design wave conditions adopted for the design of the proposed breakwater for fishery harbour at Ajanur, Dist. Kasargod, Kerala.

Table 4: Summary of the Wave Flume Test conducted at RSWS

Name of the Project – Breakwater for fishery harbour at Ajanur in Kasaragod district, Kerala
Model Scale = 1:20, Armour Unit = 8 t Tetrapod, Toe-Berm = Stone (2 – 3 t)
DWL = +2.60 m, HHWL = +1.40 m, MSL = +1.00 m, MLLW = +0.40 m
Test Duration = 1 hour (3.39 Hrs Proto), Bed Level = -4.50 m
Spectrum - Pierson-Moskowitz Spectrum

Sr. No	Water Level	Wave Height	Splashing	Over-topping	Run-up	Run-down	Damage		Remark	Photograph No.
							Toe-berm	Armour		
Random Wave Tests										
1	DWL	H_s = 4.05 m	Moderate	Nil	N.A.	N.A.	Nil	Nil		3
2	DWL	H_s = 4.85 m	Moderate	Nil	N.A.	N.A.	Nil	Nil	Endurance Test	3
3	MHHW	H_s = 4.8 m	Nil	Nil	N.A.	N.A.	Nil	Nil		4
4	MSL	H_s = 3.97 m	Nil	Nil	N.A.	N.A.	Nil	Nil		5
5	MLLW	H_s = 3.76 m	Nil	Nil	N.A.	N.A.	Nil	Nil		6
Regular Wave Tests										
6	DWL	H_{SI} = 5.0 m	Moderate	Minor	Upto +5.85 m	Upto +0.72 m	Nil	Nil	T = 10 sec	7
7	MHHW	H_{SI} = 5.02 m	Minor	Nil	Upto +5.8 m	Upto +0.15 m	Nil	Nil	T = 12 sec	8
8	MHHW	H_{SI} = 5.0 m	Nil	Nil	Upto +5.10 m	Upto [-]0.30 m	Nil	Nil	T = 10 sec	9
9	MHHW	H_{SI} = 5.0 m	Nil	Nil	Upto +4.25 m	Upto +1.0 m	Nil	Nil	T = 8 sec	10
10	MSL	H_{SI} = 5.07 m	Nil	Nil	Upto +3.50 m	Upto [-]0.50 m	Nil	Nil	T = 10 sec	11
11	MLLW	H_{SI} = 4.80 m	Nil	Nil	Upto +3.50 m	Upto [-]1.32 m	Nil	Nil	T = 10 sec	12

7.0 RECOMMENDED CROSS-SECTIONS OF THE BREAKWATER

After conducting several tests, the cross-section of the breakwater at -4.50 m bed level was found stable against various wave conditions. The details of the cross-section of the breakwater at various bed levels are as follows:

1)Trunk Portion at -2.0 m Bed Level (to be adopted from -2.0 m to +0.0 m Bed level)

The cross-section is designed for the -2.0 m bed level as shown in Fig. 3. This cross-section may be adopted from -2.0 m to +0.0 m bed level range. The cross-section of the breakwater consists of 2 t tetrapods provided in the armour layer with 1:2 slope on the sea-side from el. +2.20 m to +7.0 m and 0.5 to 1.0 t stones provided in the armour with 1:2 slope on the leeside. A 4.0 m wide toe-berm on the seaside consists of 0.5 to 1 t stones is kept at el. +2.20 m. Secondary layer consists of 200 to 300 kg stones provided below the armour layer and 50 to 100 kg stones provided below the toe-berm and leeside armour. Core consists of 20 to 50 kg stones and 0.30 m thick bedding layer consists of stones up to 20 kg. A PCC crest of 0.5 m thick is provided at el. +6.50 m soffit level with sea-side parapet top at el. +8.0 m. A clear carriageway width of 7 m is provided on the crest slab for the movement of vehicles / machineries in future during the inspection / supervision or maintenance purpose.

2) Trunk Portion at -4.50 m Bed Level (to be adopted from -2.0 m to -4.50 m Bed level)

The cross-section of breakwater at -4.50 m bed level is shown in Fig. 4. The cross-section of the breakwater consists of 6 t tetrapods provided in the armour layer with 1:2 slope on the sea-side from el. +0.0 m to +7.0 m and 1 to 2 t stones provided in the armour with 1:2 slope on the leeside. A 6.0 m wide toe-berm on seaside is kept at el. +0.0 m consists of 2 to 3 t stones. The secondary layer consists of 0.5 to 1.0 t stones provided below the armour layer and 200 to 300 kg stones provided below the toe-berm and 100 to 200 kg stones provided below the leeside armour. Core consists of 20 to 100 kg stones and 0.30 m thick bedding layer consists of stones up to 20 kg is provided at

-4.50 m bed level. A 7.0 m wide PCC crest slab of 0.5 m thick is provided at el. +5.50 m soffit level with sea-side parapet top at el. +8.0 m.

3) Roundhead at -4.50 m Bed Level

The cross-section and plan of roundhead portion of breakwater at -4.50 m bed level are shown in Figs. 5 & 6 respectively. The section consists of 8 t tetrapods placed in the armour (double layer) on 1:2 slope and are supported with the 6.0 m wide toe-berm consisting of 3 to 4 t stones at el. +0.0 m. A 8.0 m wide PCC crest slab is provided with top el. +8.0 m. A clear carriageway width of 6 m is provided on the crest slab for the movement of vehicles / machineries in future during the inspection / supervision or maintenance purpose. Secondary layer consists of 0.5 to 1.0 t stones provided below the armour layer and below the toe-berm. Core consists of 20-100 kg stones. A 0.3 m thick bedding layer is provided with stones upto 20 kg.

8.0 CONCLUDING REMARKS AND RECOMMENDATIONS

Based on the desk and the wave flume studies carried out for design of the breakwater for fishery harbour at Ajanur in Kasargod District, Kerala, the following concluding remarks are drawn:

1. The recommended cross-section of the breakwater with tetrapods in the armour layer is shown in Fig. 3 to Fig. 6. The cross section is hydraulically stable under the design wave conditions & therefore, recommended to implement at the proposed site.
2. The end of the breakwater should be protected by providing proper roundhead as shown in Figs. 5 & 6. The construction phasing may be adhered, in order to have a safety and economy of the project. If, the construction of the breakwater may not be possible during one season, as such, a temporary roundhead at the end portion may be provided wherever the work is curtailed.
3. The density of concrete and stones to be used for construction of the breakwater should be about 2.4 t / m^3 and 2.6 t / m^3, respectively.

4. There should not be any deviation from the design during the construction of the breakwater in respect of levels, slopes and weights of the stones.

5. The crest slab and the parapet wall provided at the crest of the breakwater may be constructed monolithically.

6. The packing density of the 2 t Tetrapods, 6 t Tetrapods and 8 t Tetrapods (double layer) in the armour layer of breakwater is 117 Nos., 56 Nos. and 47 Nos. per 100 sq. m. of area. The specification of 2 t Tetrapods, 6 t Tetrapods and 8 t Tetrapods are enclosed as Annexure-II, III and IV respectively.

7. All levels of the proposed breakwater should be correlated with Chart Datum before construction at the site.

8. The grading of the stones to be used in the construction for the breakwater should be as follows :

2 – 3 t stones	-	50% stones should be higher than 2.50 t
1 – 2 t stones	-	50% stones should be higher than 1.50 t
0.5 – 1 t stones	-	50% stones should be higher than 0.75 t
200 – 300 kg stones	-	50% stones should be higher than 250 kg
100 – 200 kg stones	-	50% stones should be higher than 150 kg
20 – 100 kg stones	-	75% stones should be higher than 60 kg

9. The rubble mound structures are flexible structures and it is essential to monitor and maintain them regularly. Therefore, periodic survey of the breakwater and maintenance of the breakwater, as and when any damage occurs may be undertaken.

10. It is suggested to carry out geotechnical investigations to check the probable sinkage at the site before the construction of the breakwater.



Fig. 1: Index and Location Map of Ajanur, Kasargod District, Kerala.



Fig. 2: Layout Plan for Proposed Fishing Harbour at Ajanur, Kasargod District, Kerala

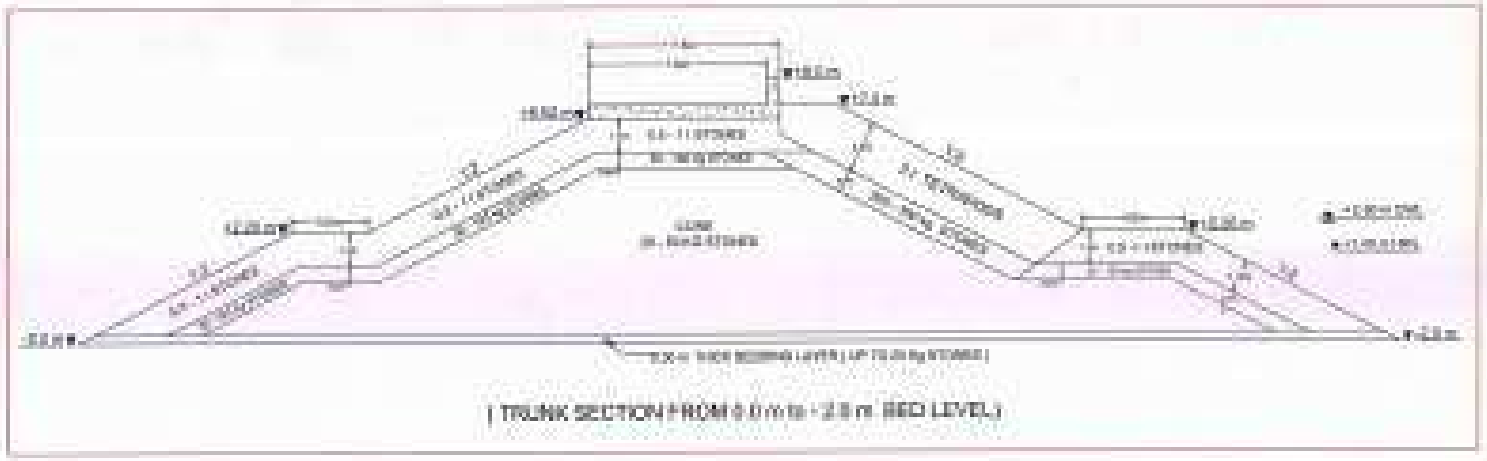


Fig. 3: Design Cross-Section of Breakwater at -2.0 m Bed Level at Ajanur, Kasargod District, Kerala

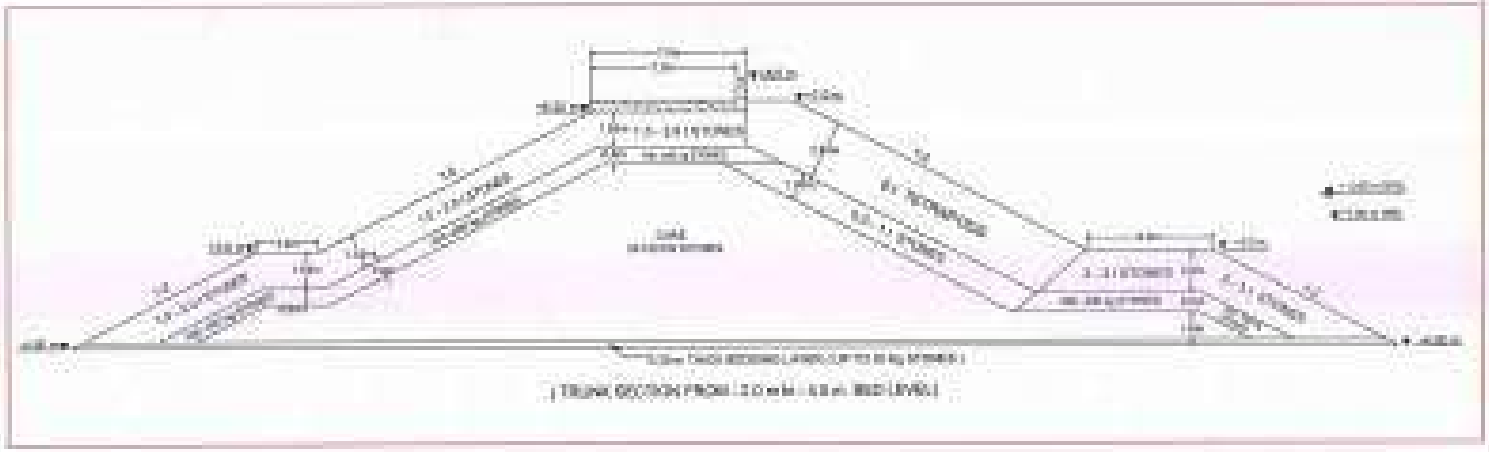


Fig. 4: Design Cross-Section of Breakwater at -4.50 m Bed Level at Ajanur, Kasargod District, Kerala

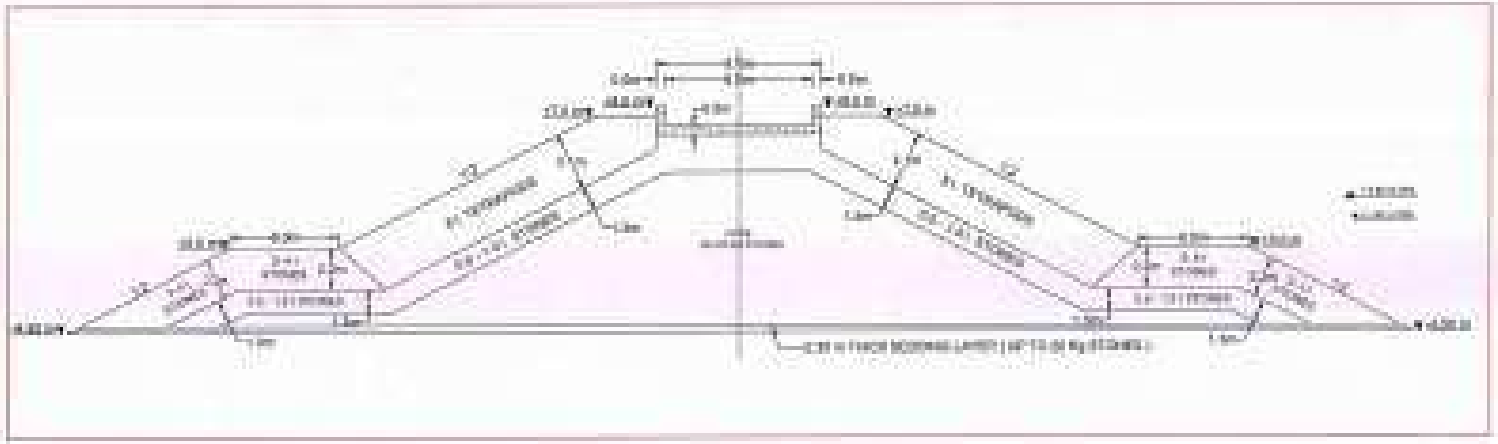


Fig. 5: Roundhead Section of Breakwater at -4.50 m Bed Level at Ajanur, Kasargod District, Kerala

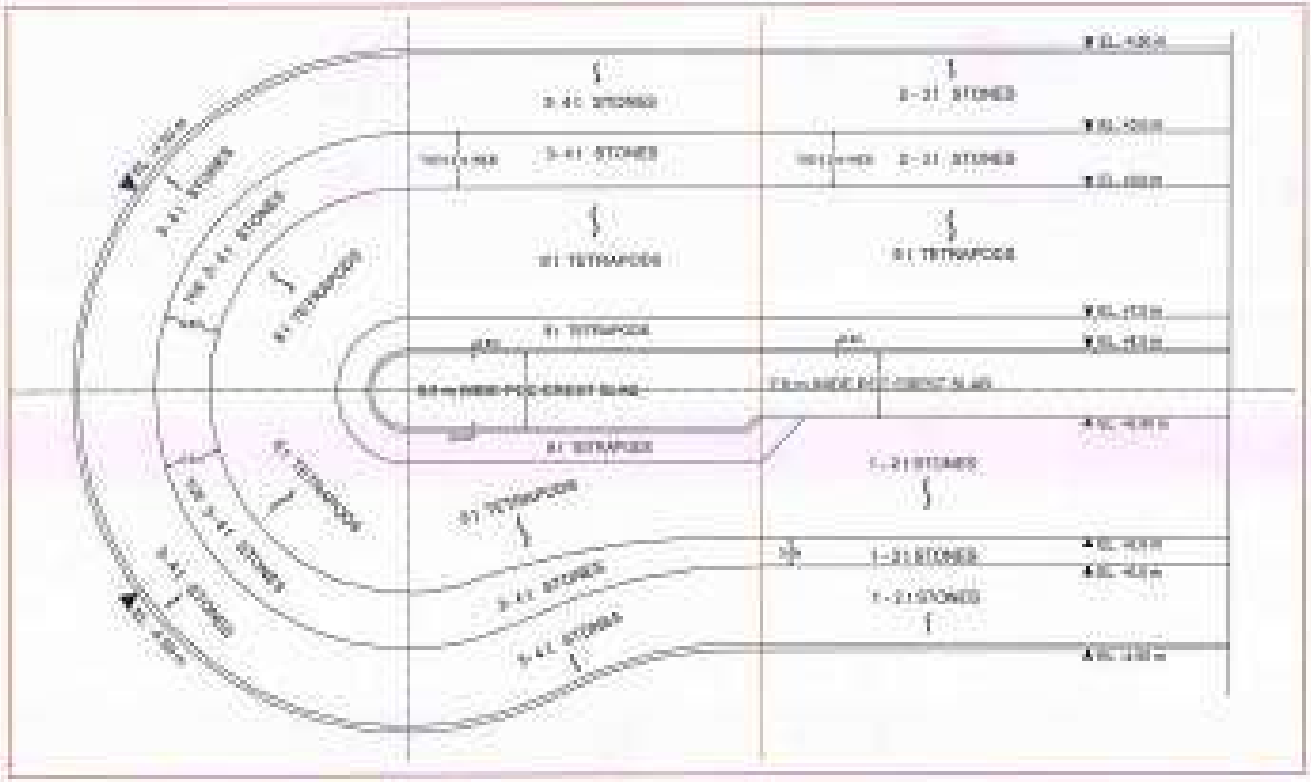
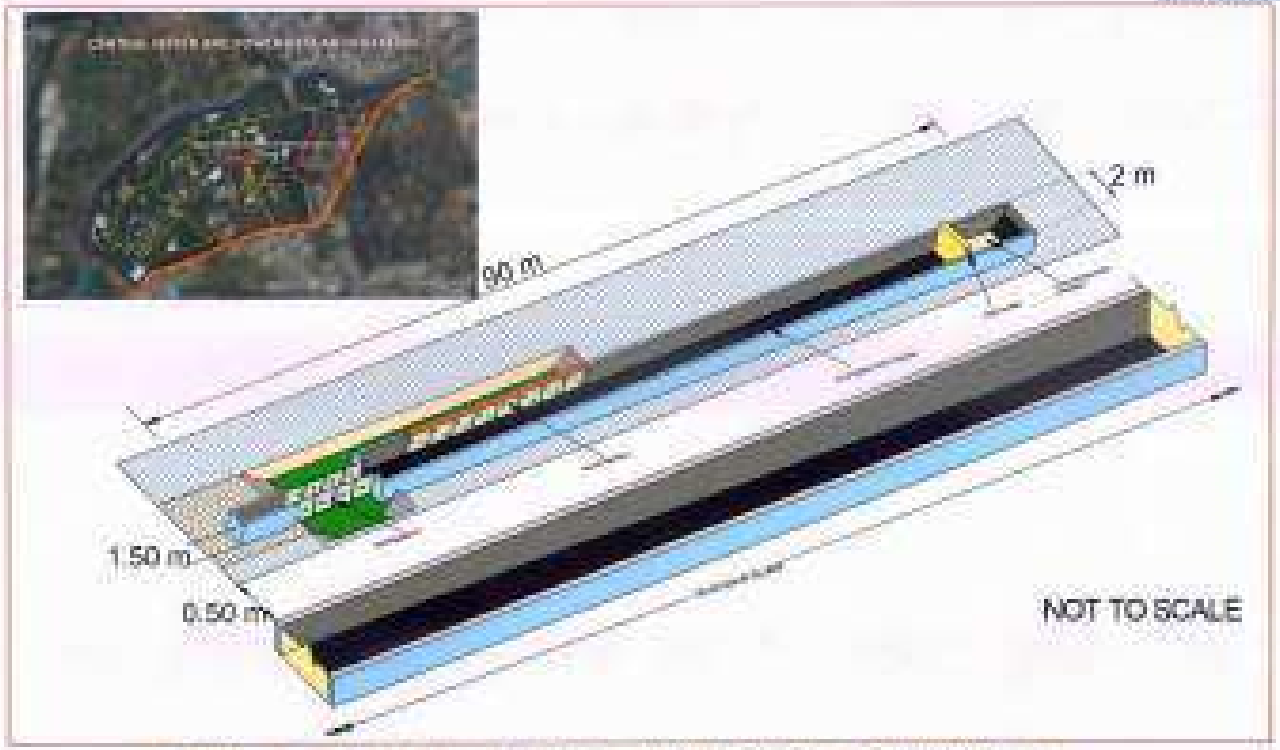


Fig. 6: Plan of Roundhead portion of Breakwater at -4.50 m Bed Level at Ajanur, Kasargod District, Kerala

Annexure I



Random Sea Wave Generation Flume (90 m) Facility at CWPRS, Pune

Annexure – II

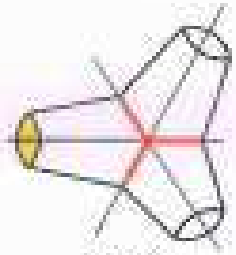
TETRAPOD SPECIFICATION

For 2 T Tetrapod

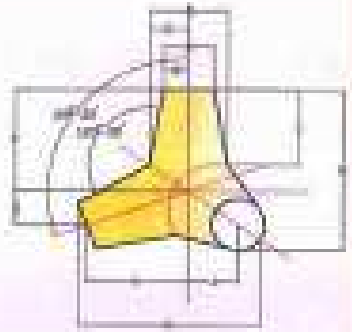
Wt. of Tetrapod	W =	2	T
Density of Concrete	w =	2.4	Ton. m
Vol. of Tetrapod	V =	0.833	Cu. meter
Overall dim. of Tetrapod	H =	1.455	meter

Dimensions of Armour Units in meter

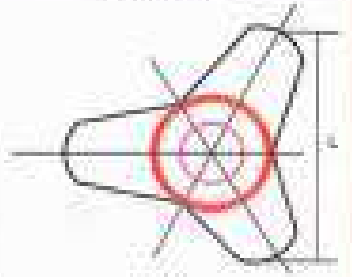
A	0.392*H	0.42
B	0.151*H	0.22
C	0.472*H	0.68
D	0.472*H	0.67
E	0.235*H	0.34
F	0.644*H	0.93
G	0.215*H	0.31
I	0.686*H	0.97
J	0.392*H	0.42
K	1.081*H	1.56
L	1.261*H	1.72



BOTTOM



ELEVATION



PLAN

Armour layer thickness (3 Units) = 1.261 * H (Double Layer)
i.e = 1.900 meter

Placing Density (N)

Number Of Tetrapods (Two Layers, Random Placed) Per Unit Area

N = n * 10^4 * (1-P/100) * (gW)^2/3

Where,

Layer coeff.	K? =	1.04	constant	N =	1.724 per sq. m. area
Porosity	P=	50	%	N =	147 per 100 sq. m. area
No. of Layers	n=	2	nos.		

Specification for 2 t Tetrapod

Annexure – III

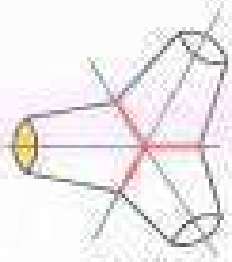
TETRAPOD SPECIFICATION

For 6 t Tetrapod

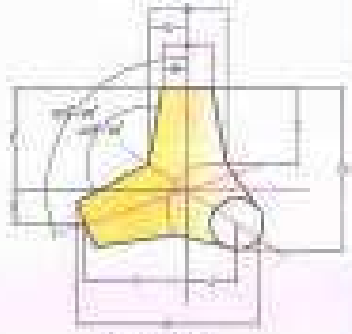
Wt. of Tetrapod	W =	6	T
Density of Concrete	w =	2.4	ton / m
Vol. of Tetrapod	V =	2.500	Cu meter
Overall dim. of Tetrapod	H =	2.000	meter

Dimensions of Armour Units in meter

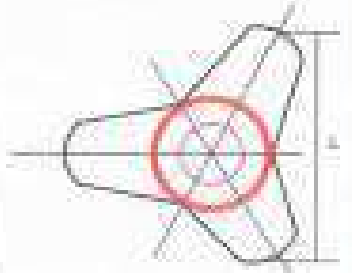
A	0.302*H	0.60
B	0.161*H	0.32
C	0.477*H	0.95
D	0.470*H	0.97
E	0.235*H	0.48
F	0.644*H	1.33
G	0.815*H	0.44
I	0.698*H	1.25
J	0.283*H	0.67
K	1.081*H	2.25
L	1.301*H	2.47



BOTTOM



ELEVATION



PLAN

Armour layer Thickness (2 Units) = 1.561 * H (Double Layer)
i.e = 2.861 (2.9)

Placing Density (N)

Number Of Tetrapods (Two Layers, Random Placed) Per Unit Area

N = n * W * (1-P/100) * (w/W)**2/3

Where,

Layer coeff.	n' =	1.04	constant
Porosity	P=	50	%
No. of Layers	n=	2	nos

N = 0.1600 per sq. m. area
N = 16 per 100 sq. m. area

Specification for 6 t Tetrapod

Annexure – IV

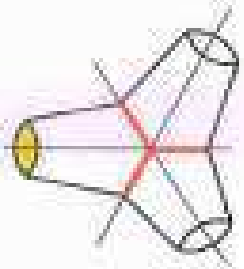
TETRAPOD SPECIFICATION

For 8 T Tetrapod

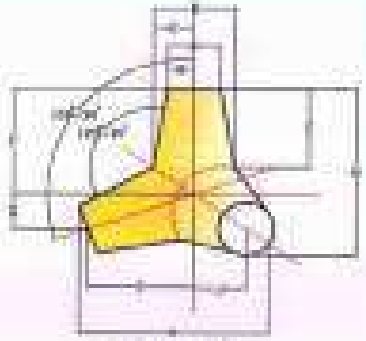
Wt. of Tetrapod	W =	8	T
Density of Concrete	w =	2.4	t/cu. m.
Vol. of Tetrapod	V =	3.333	Cu. meter
Overall dim. of Tetrapod	H =	2.264	meter

Dimensions of Armour Units in meter

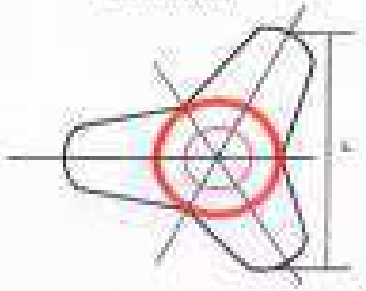
A	0.302*H	0.68
B	0.151*H	0.34
C	0.477*H	1.08
D	0.470*H	1.06
E	0.235*H	0.53
F	0.644*H	1.46
G	0.215*H	0.49
I	0.606*H	1.37
J	0.303*H	0.69
K	1.091*H	2.47
L	1.201*H	2.72



BOTTOM



ELEVATION



Armour layer Thickness (2 Units) = 1.381 * H (Double Layer)
i.e = 3.063 meter

Placing Density (N)
Number Of Tetrapods (Two Layers, Random Placed) Per Unit Area
N = n* KΔ * [1-P/100] * [w/W]^-2/3
Where,

Layer coeff.	KΔ =	1.04	constant
Porosity	P=	50	%
No. of Layers	n=	2	nos

N =	0.485	per sq. m. area
N =	47	per 100 sq. m. area

Specification for 8 t Tetrapod

Annexure - V



Photo 1: 90 m long RSWG wave flume facility at CWPRS



Photo 2: Random wave test with H_s = 4.85 m at DWL = +2.60 m



Photo 3: Random wave test with H_s = 4.85 m at DWL = +2.60 m (Endurance Test)



Photo 4: Random wave test with H_s = 4.0 m at MHHW = +1.40 m



Photo 5: Random wave test with H_s = 3.97 m at MSL = +1.00 m



Photo 6: Random wave test with H_s = 3.76 m at MLLW = +0.40 m



Photo 7: Regular wave test with H_{10} = 5.0 m at DWL = +2.60 m, t = 10 sec



Photo 8: Regular wave test with H_{10} = 5.12 m at MHHW = +1.40 m, t = 12 sec



Photo 9: Regular wave test with H_{10} = 5.0 m at MHHW = +1.40 m, t = 10 sec



Photo 10: Regular wave test with $H_{1/3}$ = 5.0 m at MHHW = +1.40 m, t = 8 sec



Photo 11: Regular wave test with $H_{1/3}$ = 5.07 m at MSL = +1.00 m, t = 10 sec



Photo 12: Regular wave test with H_0 = 4.80 m at MLLW = +0.40 m, t = 10 sec

By Speed Post

सत्यमेव जयते

भारत सरकार / Government of India
जल शक्ति मंत्रालय / Ministry of Jal Shakti
जल संसाधन, नदी विकास और गंगा संरक्षण विभाग
Department of Water Resources, River Development and Ganga Rejuvenation
केन्द्रीय जल और विद्युत अनुसंधान शाला
खड़कवासला, पुणे - 411 024
CENTRAL WATER & POWER RESEARCH STATION
Khadakwasla, Pune – 411 024

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✉:tayade.br@cwprs.gov.in
🖷:020-24381004
🖳:www.cwprs.gov.in

संख्या/No.: CHS/2024/01/141

दिनांक/Date: 09.08.2024

The Chief Engineer
Harbour Engineering Department
Kamaleswaram, Manacaud,
Thiruvananthapuram
Kerala – 695 009

Sub: Desk & wave flume studies for the design of breakwater for fishery harbor at Ajanur in Kasargod district, Kerala.

Ref: 1) Your letter No. HECE/207/2022-DR8 dated 01.08.2024
2) Discussions at CWPRS on 30.07.2024
3) CWPRS Technical Report No. 6177, November 2023

Sir,

This has a reference to the above cited correspondence regarding the desk & wave flume studies for the design of breakwater for fishery harbor at Ajanur in Kasargod district, Kerala. A request has been made to review the Technical Report (Ref. 3) to optimize the breakwater design. The possibility of optimization of the breakwater cross-sections were discussed during your visit to CWPRS on 30.07.2024. Accordingly, desk studies have been conducted considering the project requirements, and minor modifications to the breakwater cross-sections have been carried out, as shown in Figs. 1 to 4.

The modified design cross-sections of the breakwater include a revised crest width of 5.5 m instead of 7.0 m, except for the roundhead crest width, which remains at 8.0 m. In the modified cross-section for the -2.0 m bed level, the lee side armour consists of 0.5-1.0 t stones placed on a 1:1.5 slope, with a toe-berm consisting of 0.5-1.0 t stones placed at el. +0.2 m, as shown in Fig. 1. In the modified cross-section for the -4.5 m bed level, the lee side armuor consists of 1.0-2.0 t stones placed on a 1:1.5 slope, with a toe-berm consisting of 1.0-2.0 t stones placed at el. -2.55 m, as shown in Fig. 2. Minor modifications have also been made to the toe-berm portion of the roundhead. The toe-berm consists of 3.0-4.0 t

stones placed at el. -0.7 m, as shown in Fig. 3. The modified plan of the roundhead is shown in Fig. 4. All other details of the breakwater design cross-sections will remain the same as provided in CWPRS Technical Report No. 6177, November 2023.

Hope this would meet with your requirements.

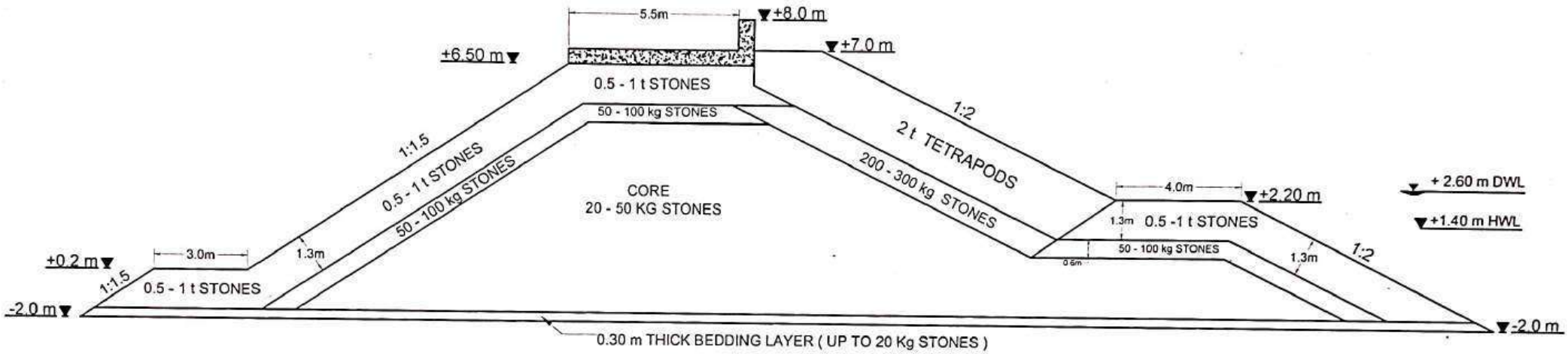
धन्यवाद,

भवदीय,

7/8/2024

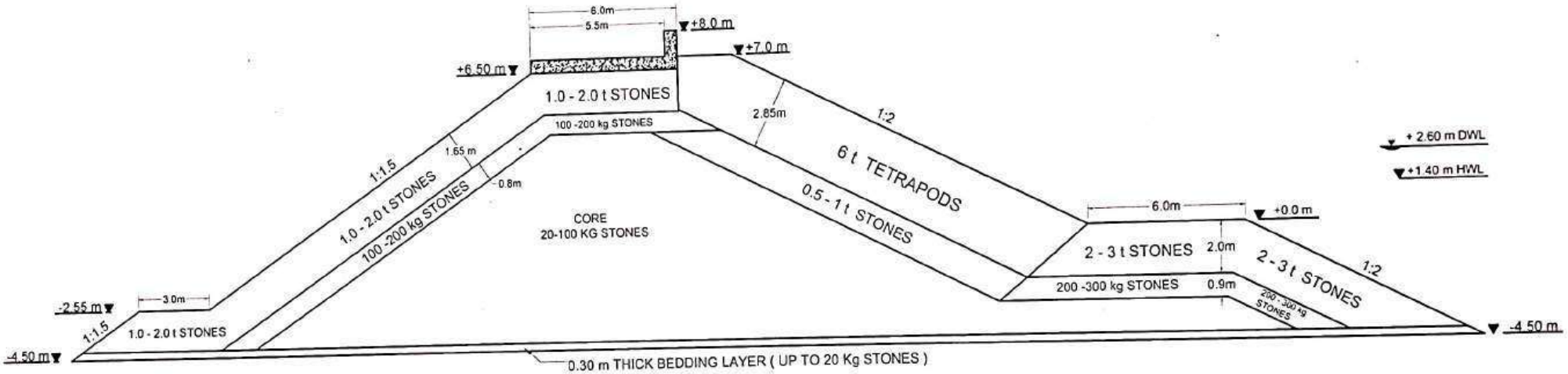
(ए वी महालिंगैया/A.V.Mahalingaiah)
वैज्ञानिक 'ई' / Scientist 'E'

"जल ही जीवन का आधार है।"



(TRUNK SECTION FROM 0.0 m to - 2.0 m BED LEVEL)

FIG 1 :- MODIFIED DESIGN CROSS -SECTION OF BREAKWATER AT -2.0 m BED LEVEL, AJANUR, KERALA



(TRUNK SECTION FROM - 2.0 m to - 4.5 m BED LEVEL)

FIG 2:- MODIFIED DESIGN CROSS-SECTION OF BREAKWATER AT - 4.50 m BED LEVEL, AJANUR, KERALA

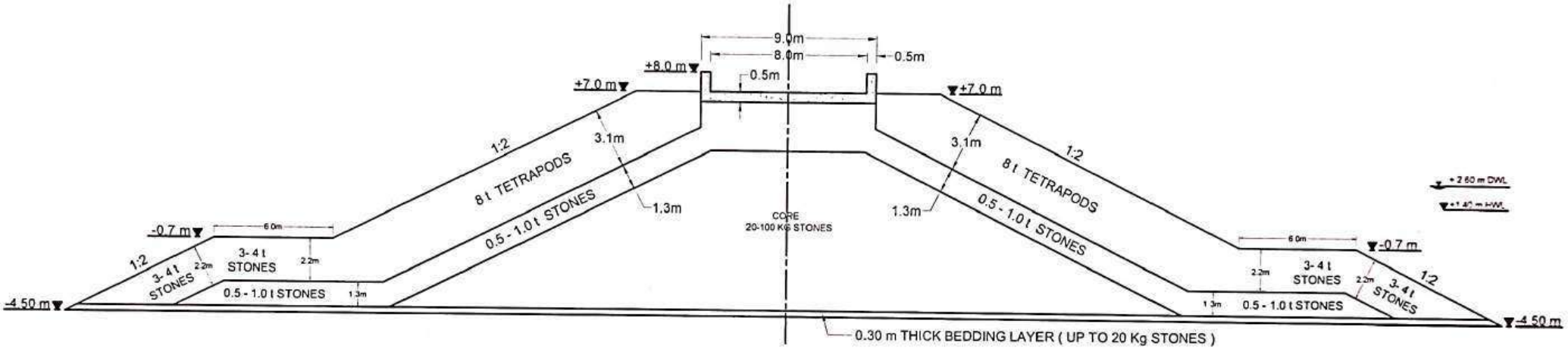


FIG 3 :- MODIFIED ROUNDHEAD CROSS-SECTION OF BREAKWATER AT -4.5 m BED LEVEL, AJANUR, KERALA

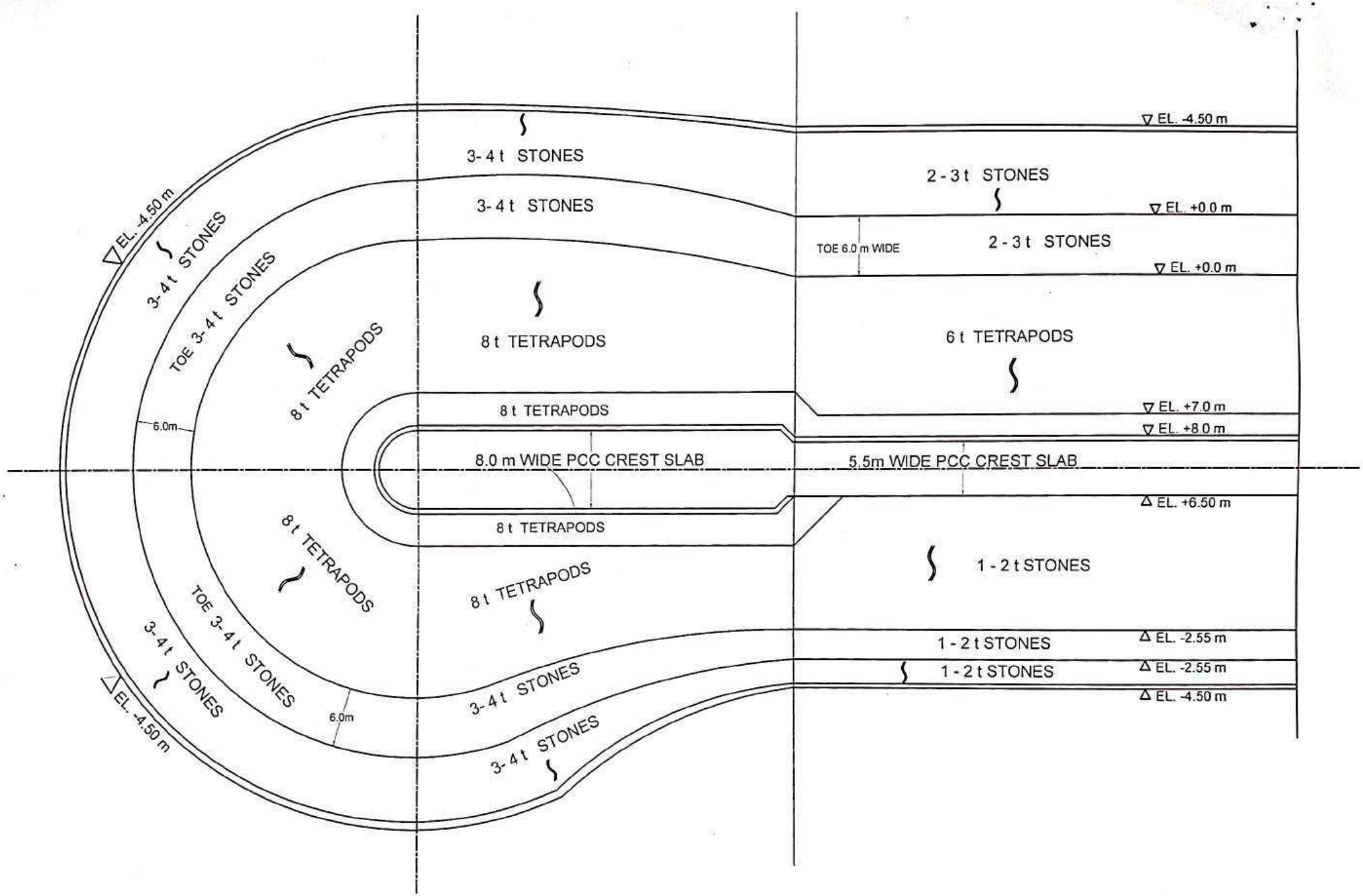


FIG 4 :- PLAN OF ROUNDHEAD SECTION OF BREAKWATER AT -4.5 m BED LEVEL, AJANUR, KERALA

GENERAL ABSTRACT

PMMSY - Construction of Ajanur Fishing Harbour - General Abstract				
Sl No	**Item**	**Quantity**	**Unit Rate in Rs**	**Amount in Rs**
1	Construction of Breakwater at Ajanoor	1575m	772063.5	1,21,60,00,000
2	Construction of river training wall and and dredging near the river training area	training wall-435m dredging- 31000 m3		32,60,00,000
3	Dredging And Construction of reclamation Bund	dredging - 132500 m3 reclamation bund- 400 m		6,24,00,000
4	Wharf and Auction Hall	Wharf - 120 m x 6.6 m , Auction Hall - 60 m x 15 m Total 1692m3	34929.1	5,91,00,000
5	Canteen, Rest shed, Locker room, Gear Shed	45 m x 10 m (two Storey)	27666.7	2,49,00,000
6	Compound wall and Side Protection Works	compound wall- 510 m side protection- 1710 m		6,14,00,000
7	Gate and Gate House	2.4 m x 2.4 m ATM and Toll Booth each (area 47.16m2)	38167.9	18,00,000
7	Internal Road, Parking area and Drainage facility	Parking Area - 4320 sqm	3873.6	2,82,00,000
		Internal Road - 740*4 m		
8	Toilet Block	13.3*5	37594.0	25,00,000
9	Construction of approach road to fishing harbour	950 m	14526.3	1,38,00,000
10	Construction of workshop building	9.8*9.8 m	48521.4	46,80,000
11	Construction of office room cum harbour surveillance camera room	14.6*22.6 m (2 storey)	26851.7	89,00,000
12	Construction of wharf for berthing facility	100*5 m	42800.0	2,14,00,000
15	OH Tank and Water Supply Arrangement	As per estimate		1,89,00,000
14	Effluent Treatment Plant	LS		35,00,000
17	Navigational Facility	LS		2,00,000
18	Pressure Washer and Cleaning equipments	LS		6,00,000
19	Landscaping, Green Belt and Rainwater Harvesting	LS		20,00,000
24	Mechanical conveyor system & Automation	LS		1,50,00,000
23	Electrification and Installation of Solar energy system	LS		2,50,00,000
			Total (A)	**1,89,62,80,000**

Smart Infrastructure and automated systems			
30	Smart Technology Investments		
30.1	Procurement and installation of smart infrastructure components, such as IoT devices, sensors, communication networks, and data management systems including cost of hardware, software, and installation services.	LS	1,00,00,000
30.2	Development or customization of software for data management, analysis and visualization	LS	50,00,000
31	Communication and Connectivity		
31.1	Deployment of communication infrastructure, including internet connectivity, satellite communication systems, and wireless networks	LS	50,00,000
31.2	Implementation of networking equipment and cybersecurity measures	LS	50,00,000
32	Safety and Security Measures		
32.1	Investment in safety equipment (distress beacons and rescue drones)	LS	50,00,000
32.2	Installation of surveillance system including CCTV camera	LS	50,00,000
35	Provide charging stations for electric vehicles	L.S	10,00,000
36	Vehilce for installing IOT devices	L.S	35,00,000
		Sub total	**3,95,00,000**
		GST @ 18%	**71,10,000**
		Sub Total including GST @ 18% (B)	**4,66,10,000**
		Sub Total (C= A+B)	**1,94,28,90,000**
		Contingencies @ 3%	**5,71,10,000**
		Grand Total	**2,00,00,00,000**
Rupees Two hundred crore only			

ESTIMATES

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of Breakwater-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Appendix A- North Breakwater- 1150m**			
1.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	8500.000cum	@210.02/cum	1785170.00
1.002	OD7023/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	33200.000tonne	@935.64/tonne	31063248.00
1.003	OD4410/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	27300.000tonne	@935.64/tonne	25542972.00

Sl No	Specification	Quantity	Rate	Amount
1.004	OD4413/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20kg to 100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	237600.000tonne	@935.64/tonne	222308064.00
1.005	OD7021/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	47400.089tonne	@935.64/tonne	44349419.27
1.006	OD7020/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	9500.018tonne	@935.64/tonne	8888596.84
1.007	OD7018/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	22600.043tonne	@1093.96/tonne	24723543.04
1.008	OD7017/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 0.5-1T and above category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	49000.087tonne	@1077.91/tonne	52817683.78
1.009	OD235/2022-2023			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1 T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings			

Sl No	Specification	Quantity	Rate	Amount
	with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site			
	Net Total	69100.130tonne	@1077.91/tonne	74483721.13
1.010	OD7158/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T - 3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	51000.088tonne	@1077.91/tonne	54973504.86
1.011	65.103			
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .			
	Net Total	3100.000each	@7537.42/each	23366002.00
1.012	65.104			
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site			
	Net Total	3100.000each	@909.34/each	2818954.00
1.013	OD7266/2023-2024			
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate			

Sl No	Specification	Quantity	Rate	Amount
	of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer			
	Net Total	7500.000each	@22383.48/each	167876100.00
1.014	OD7610/2023-2024			
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete			
	Net Total	7500.000each	@1556.05/each	11670375.00
1.015	65.124			
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.			
	Net Total	370.000each	@29749.73/each	11007400.10
1.016	65.125			
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete			
	Net Total	370.000each	@2214.51/each	819368.70
			Heading Total(Rs)	758494122.72
2	**Appendix B - Southern Breakwater- 425m**			
2.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	4300.000cum	@210.02/cum	903086.00

Sl No	Specification	Quantity	Rate	Amount
2.002	OD7147/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	12500.000tonne	@935.64/tonne	11695500.00
2.003	OD7146/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	45100.000tonne	@935.64/tonne	42197364.00
2.004	OD7145/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	56000.000tonne	@935.64/tonne	52395840.00
2.005	OD7144/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	9000.000tonne	@935.64/tonne	8420760.00
2.006	OD7143/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10 kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	6500.000tonne	@935.64/tonne	6081660.00
2.007	OD7142/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once			

Sl No	Specification	Quantity	Rate	Amount
	in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	8600.000tonne	@1093.96/tonne	9408056.00
2.008	OD7141/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 500 Kg -1T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	26600.000tonne	@1077.91/tonne	28672406.00
2.009	OD241/2022-2023			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site			
	Net Total	16400.000tonne	@1077.91/tonne	17677724.00
2.010	OD7159/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T-3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with			

Sl No	Specification	Quantity	Rate	Amount
	approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	15300.000tonne	@1077.91/tonne	16492023.00
2.011	65.103			
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .			
	Net Total	2950.000each	@7537.42/each	22235389.00
2.012	65.104			
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site			
	Net Total	2950.000each	@909.34/each	2682553.00
2.013	OD7279/2023-2024			
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer			
	Net Total	1750.000each	@22383.48/each	39171090.00
2.014	OD7611/2023-2024			
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc			

Sl No	Specification	Quantity	Rate	Amount
	complete			
	Net Total	1750.000each	@1556.05/each	2723087.50
2.015	65.124			
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.			
	Net Total	350.000each	@29749.73/each	10412405.50
2.016	65.125			
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete			
	Net Total	350.000each	@2214.51/each	775078.50
	Heading Total(Rs)			271944022.50
	Total Estimation PAC			1030438145.22
4	**Extra Charges**			
3.001	Provision for GST			
	1030438145.22		18.00%	185478866.14
	Grand Total			1215917011.36
	Round off			82988.64
	Rounded Total(Rs)			1216000000.00
	Rupees One Hundred Twenty One Crore Sixty Lakh			

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of Breakwater-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Appendix A- North Breakwater- 1150m						
1.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	Break water on the land connection area						
		1.000	100.000	50.000	(1.2+2.2)/2		8500.000
	Total						**8500.000**
						Total Quantity in cum	**8500.000**
1.002	OD7023/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	Upto 20kg stones						
	Ch 0 to 210	1.000	210.000	(13.84+14.89)/2	(2/3)*2.65		5329.425
	Ch 210 to 1150	1.000	940.000	(15.24+16.81)/2	(2/3)*2.65		26612.234
	Head portion as per calculation sheet	1.000	628.540		(2/3)*2.65		1110.423
	Rounding	1.000	147.918				147.918
	Total						**33200.000**
						Total Quantity in tonne	**33200.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.003	OD4410/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	10 to 200 Kg stones						
	Ch 210 to 1150	1.000	940.000	(15.26+17.42)/2	2/3*2.65		27135.345
	Rounding	1.000	164.655				164.655
	Total						**27300.000**
						Total Quantity in tonne	**27300.000**
1.004	OD4413/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20kg to 100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20 to 100 Kg stones						
	Ch 210 to 1150	1.000	940.000	(117.95+163.28)/2	2/3*2.65		233515.084
	Head portion as per calculation sheet	1.000	2198.950		2/3*2.65		3884.819
	Rounding	1.000	200.097				200.097
	Total						**237600.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in tonne	**237600.000**
1.005	OD7021/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20-50kg stones						
	Ch 0 to 210	1.000	210.000	(112.86+141.63)/2	(2/3)*2.65		47207.984
	Rounding	1.000	192.105				192.105
	Total						**47400.089**
						Total Quantity in tonne	**47400.089**
1.006	OD7020/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	50-100kg stones						
	Ch 0 to 210	1.000	210.000	(24.19+25.99)/2	(2/3)*2.65		9308.408
	Rounding	1.000	191.610				191.610
	Total						**9500.018**
						Total Quantity in tonne	**9500.018**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.007	OD7018/2023-2024						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	200- 300kg stones						
	Ch 0 to 210	1.000	210.000	(10.29+12.52)/2	(2/3)*2.65		4231.263
	Ch 210 to 1150	1.000	940.000	(11.03+11.03)/2	(2/3)*2.65		18317.188
	Rounding	1.000	51.592				51.592
	Total						**22600.043**
						Total Quantity in tonne	**22600.043**
1.008	OD7017/2023-2024						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 0.5-1T and above category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	500 Kg to 1T Stones						
	Ch 0 to 210	1.000	210.000	(47.5+49.84)/2	(2/3)*2.65		18056.604

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Ch 210 to 1150	1.000	940.000	(14.45+18.89)/2	(2/3)*2.65		27683.366
	Head portion as per calculation sheet	1.000	1790.050		(2/3)*2.65		3162.428
	Rounding	1.000	97.689				97.689
	Total						**49000.087**
						Total Quantity in tonne	**49000.087**
1.009	OD235/2022-2023						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1 T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site						
	1T to 2T Stones						
	Ch 210 to 1150	1.000	940.000	(39.35+43.81)/2	(2/3)*2.65		69050.650
	Rounding	1.000	49.480				49.480
	Total						**69100.130**
						Total Quantity in tonne	**69100.130**
1.010	OD7158/2023-2024						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T - 3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	2T - 3T Stones						
	Ch 300 to 1150	1.000	940.000	(28.21+28.21)/2	(2/3)*2.65		46847.495
	Head portion as per calculation sheet	1.000	2294.810		(2/3)*2.65		4054.172
	Rounding	1.000	98.421				98.421
	Total						**51000.088**
						Total Quantity in tonne	**51000.088**
1.011	65.103						
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .						
	Moulding & supplying 2T						
	Ch 0 to 210	1.000	210.000	(11.07+13.3)/2		1.196000	3060.385
	Rounding	1.000	39.615	1.000	1.000	1.000000	39.615
	Total						**3100.000**
						Total Quantity in each	**3100.000**
1.012	65.104						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site						
	Conveying 2T tetrapod						
	Quantity as per item 11	1.000	3100.000				3100.000
	Total						**3100.000**
						Total Quantity in each	**3100.000**
1.013	OD7266/2023-2024						
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer						
	Moulding & supplying 6 T						
	Ch 210 to 1150	1.000	940.000	(12+15.31)/2		0.580000	7444.706
	Rounding	1.000	55.294			1.000000	55.294
	Total						**7500.000**
						Total Quantity in each	**7500.000**
1.014	OD7610/2023-2024						
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	Conveying 6T tetrapod						
	Quantity as per item 13	1.000	7500.000				7500.000
	Total						**7500.000**
						Total Quantity in each	**7500.000**
1.015	65.124						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.						
	Moulding & Supplying 8T Tetrapods						
	Round head	1.000	3.14*12.9	18.780		0.480000	365.137
	Rounding	1.000	4.863				4.863
	Total						**370.000**
						Total Quantity in each	**370.000**
1.016	65.125						
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	Conveying 8T tetrapod						
	Quantity as per item 15	1.000	370.000				370.000
	Total						**370.000**
						Total Quantity in each	**370.000**
2	Appendix B - Southern Breakwater- 425m						
2.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	Break water on the land connection area						
		1.000	50.000	50.000	(1.2+2.2)/2		4250.000
	rounding	1.000	50.000				50.000
	Total						**4300.000**
						Total Quantity in cum	**4300.000**
2.002	OD7147/2023-2024						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	Up to 20 Kg stones						
	Ch 0 to 200	1.000	200.000	(13.84+14.89)/2	(2/3)*2.65		5075.643
	Ch 200 to 425	1.000	225.000	(15.24+16.29)/2	(2/3)*2.65		6266.599
	Head portion as per calculation sheet	1.000	594.600		(2/3)*2.65		1050.462
	Rounding	1.000	107.296	1.000	1.000		107.296
	Total						**12500.000**
						Total Quantity in tonne	**12500.000**
2.003	OD7146/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20 Kg - 50 Kg stones						
	Ch 0 to 200	1.000	200.000	(112.86+141.63)/2	(2/3)*2.65		44959.985
	rounding	1.000	140.015	1.000	1.000		140.015

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**45100.000**
						Total Quantity in tonne	**45100.000**
2.004	OD7145/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20-100kg stones						
	Ch 200 to 425	1.000	225.000	(117.95+146.87)/2	(2/3)*2.65		52633.074
	head portion as per calculation	1.000	1888.330		(2/3)*2.65		3336.056
	rounding	1.000	30.870				30.870
	Total						**56000.000**
						Total Quantity in tonne	**56000.000**
2.005	OD7144/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	50Kg - 100kg stones						
	Ch 0 to 200	1.000	200.000	(24.19+25.99)/2	(2/3)*2.65		8865.150

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	134.850				134.850
	Total						**9000.000**
						Total Quantity in tonne	**9000.000**
2.006	OD7143/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10 kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	100-200kg stones						
	Ch 200 to 425	1.000	225.000	(15.26+16.7)/2	(2/3)*2.65		6352.062
	Rounding	1.000	147.938				147.938
	Total						**6500.000**
						Total Quantity in tonne	**6500.000**
2.007	OD7142/2023-2024						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	200Kg - 300 Kg stones						
	Ch 0 to 200	1.000	200.000	(10.29+12.52)/2	(2/3)*2.65		4029.774
	Ch 200 to 425	1.000	225.000	(11.03+11.03)/2	(2/3)*2.65		4384.433

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	185.793				185.793
	Total						**8600.000**
						Total Quantity in tonne	**8600.000**
2.008	OD7141/2023-2024						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 500 Kg -1T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	500 Kg -1T Stones						
	Ch 0 to 200	1.000	200.000	(47.5+49.84)/2	(2/3)*2.65		17196.766
	Ch 200 to 425	1.000	225.000	(14.45+17.44)/2	(2/3)*2.65		6338.149
	head portion as per calculation	1.000	1667.380		(2/3)*2.65		2945.710
	rounding	1.000	119.375				119.375
	Total						**26600.000**
						Total Quantity in tonne	**26600.000**
2.009	OD241/2022-2023						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	1T-2T Stones						
	Ch 200 to 425	1.000	225.000	(39.35+42.32)/2	(2/3)*2.65		16231.943
	Rounding	1.000	168.057				168.057
	Total						**16400.000**
						Total Quantity in tonne	**16400.000**
2.010	OD7159/2023-2024						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T-3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	2-3T Stones						
	Ch 200 to 425	1.000	225.000	(28.21+28.21)/2	(2/3)*2.65		11213.496
	Head portion as per calculation sheet	1.000	2213.980		(2/3)*2.65		3911.372
	rounding	1.000	175.132				175.132
	Total						**15300.000**
						Total Quantity in tonne	**15300.000**
2.011	65.103						
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Moulding & supplying 2T						
	Ch 0 to 200	1.000	200.000	(11.07+13.3)/2		1.196000	2914.652
	Rounding	1.000	35.348	1.000		1.000000	35.348
	Total						**2950.000**
						Total Quantity in each	**2950.000**
2.012	65.104						
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site						
	Conveying 2T tetrapod						
	Quantity as per item 11	1.000	2950.000				2950.000
	Total						**2950.000**
						Total Quantity in each	**2950.000**
2.013	OD7279/2023-2024						
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer						
	Moulding & supplying 6T						
	Ch 200 to 425	1.000	225.000	(12+14.2)/2		0.580000	1709.550
	Ch 350 to 435	1.000	40.450				40.450
	Total						**1750.000**
						Total Quantity in each	**1750.000**
2.014	OD7611/2023-2024						
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	conveying 6T tetrapod						
	Quantity as per item 13	1.000	1750.000				1750.000
	Total						**1750.000**
						Total Quantity in each	**1750.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
2.015	65.124						
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.						
	Moulding & supplying 8T						
	Round head	1.000	3.14*12.4	17.660		0.480000	330.053
	rounding	1.000	19.947	1.000	1.000	1.000000	19.947
	Total						**350.000**
						Total Quantity in each	**350.000**
2.016	65.125						
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	conveying 8T tetrapod						
	Quantity as per item 15	1.000	350.000				350.000
	Total						**350.000**
						Total Quantity in each	**350.000**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of River training work and Dredging near the river training area-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Appendix A -River training work-435m**			
1.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	4250.000cum	@210.02/cum	892585.00
1.002	OD5423/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	12550.022tonne	@935.64/tonne	11742302.58
1.003	OD5426/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	58500.110tonne	@935.64/tonne	54735042.92

Sl No	Specification	Quantity	Rate	Amount
1.004	OD5425/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20kg to 100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	44300.078tonne	@935.64/tonne	41448924.98
1.005	OD5427/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	11600.022tonne	@935.64/tonne	10853444.58
1.006	OD5428/2024-2025			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges			

Sl No	Specification	Quantity	Rate	Amount
	etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	8700.017tonne	@1093.96/tonne	9517470.60
1.007	OD5424/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	5000.000tonne	@935.64/tonne	4678200.00
1.008	OD5429/2024-2025			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 0.5-1T and above category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	30300.052tonne	@1077.91/tonne	32660729.05
1.009	OD5430/2024-2025			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1 T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings			

Sl No	Specification	Quantity	Rate	Amount
	with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site			
	Net Total	12700.024tonne	@1077.91/tonne	13689482.87
1.010	OD5431/2024-2025			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T - 3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	12700.016tonne	@1077.91/tonne	13689474.25
1.011	65.103			
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .			
	Net Total	3800.000each	@7537.42/each	28642196.00
1.012	65.104			
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site			
	Net Total	3800.000each	@909.34/each	3455492.00
1.013	OD5432/2024-2025			
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate			

Sl No	Specification	Quantity	Rate	Amount
	of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer			
	Net Total	1350.000each	@22383.48/each	30217698.00
1.014	OD5433/2024-2025			
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete			
	Net Total	1350.000each	@1556.05/each	2100667.50
1.015	65.124			
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.			
	Net Total	350.000each	@29749.73/each	10412405.50
1.016	65.125			
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete			
	Net Total	350.000each	@2214.51/each	775078.50
	Heading Total(Rs)			269511194.33
2	**Appendix B- Dredging near river training area**			
2.001	65.82			
	Deepening the harbour basin and mouth by using dredger having a flow rate of 700 to 1000m3 slurry per hour with a solid output of not less than 127.5 m3/hour and dumping the spoil at location already pointed out by the departmental officers with a lead up to a radial distance of 500m, including hire charges of dredger, all tools and plants and accesories , fuel charges, idling and mobilisation charges, providing and shifting the pipe lines including all labour charges, incidental charges etc. and drtvice			

Sl No	Specification	Quantity	Rate	Amount
	taxes complete for a depth upto (-) 4.50m bedlevel with a tolerance of +/- 20cm. Unexpected Error occured Please Login again!! Click here to Login			
	Net Total	31000.000cum	@182.57/cum	5659670.00
			Heading Total(Rs)	5659670.00
			Total Estimation PAC	275170864.33
Sl No	**Description**		**Percentage/LS**	**Amount**
3	**Lumsum Heading**			
3.001	LS provision for part TS			
		null	null%	500000.00
			Total Lumsum Amount	500000.00
4	**Extra Charges**			
3.001	Provision for GST			
		275170864.33	18.00%	49530755.58
			Grand Total	325201619.91
			Round off	798380.09
			Rounded Total(Rs)	326000000.00
	Rupees Thirty Two Crore Sixty Lakh			

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of River training work and Dredging near the river training area-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Appendix A -River training work-435m						
1.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	River Training work						
		1.000	50.000	50.000	(1.2+2.2)/2		4250.000
	Total						**4250.000**
						Total Quantity in cum	**4250.000**
1.002	OD5423/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	Upto 20 kg stones						
	Ch 0 to 260	1.000	260.000	(13.84+14.89)/2	2/3*2.65		6598.336
	Ch 260 to 435	1.000	175.000	(15.24+16.29)/2	2/3*2.65		4874.022
	Head As per calculation sheet	1.000	594.600		2/3*2.65		1050.462
	Rounding	1.000	27.202				27.202
	Total						**12550.022**
						Total Quantity in tonne	**12550.022**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.003	OD5426/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20 - 50 kg stones						
	Ch 0 to 260	1.000	260.000	(112.86+ 141.63)/2	2/3*2.65		58447.980
	Rounding	1.000	52.130				52.130
	Total						**58500.110**
						Total Quantity in tonne	**58500.110**
1.004	OD5425/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20kg to 100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20 to 100 Kg Stones						
	Ch 260 to 435	1.000	175.000	(117.95+ 146.87)/2	2/3*2.65		40936.836
	Head portion as per calculation sheet	1.000	1888.330		2/3*2.65		3336.056
	Rounding	1.000	27.186				27.186
	Total						**44300.078**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in tonne	**44300.078**
1.005	OD5427/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	50 to 100 Kg						
	Ch 0 to 260	1.000	260.000	(24.19+25.99)/2	2/3*2.65		11524.695
	Rounding	1.000	75.327				75.327
	Total						**11600.022**
						Total Quantity in tonne	**11600.022**
1.006	OD5428/2024-2025						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	200 to 300 Kg stones						
	Ch 0 to 260	1.000	260.000	(10.29+12.52)/2	2/3*2.65		5238.707
	Ch 260 to 435	1.000	175.000	(11.03+11.03)/2	2/3*2.65		3410.115

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Rounding	1.000	51.195				51.195
	Total						**8700.017**
						Total Quantity in tonne	**8700.017**
1.007	OD5424/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	10- 200 kg Stone						
	Ch 260 to 435	1.000	175.000	(15.26+16.7)/2	2/3*2.65		4940.493
	Rounding	1.000	59.507				59.507
	Total						**5000.000**
						Total Quantity in tonne	**5000.000**
1.008	OD5429/2024-2025						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 0.5-1T and above category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	500 to 1 T						
	Ch 0 to 260	1.000	260.000	(47.5+49.84)/2	2/3*2.65		22355.796
	Ch 260 to 435	1.000	175.000	(14.45+17.44)/2	2/3*2.65		4929.672

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Head As per calculation sheet	1.000	1667.380		2/3*2.65		2945.710
	Rounding	1.000	68.874				68.874
	Total						**30300.052**
						Total Quantity in tonne	**30300.052**
1.009	OD5430/2024-2025						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1 T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site						
	1 T to 2 T						
	Ch 260 to 435	1.000	175.000	(39.35+42.32)/2	2/3*2.65		12624.845
	Rounding	1.000	75.179				75.179
	Total						**12700.024**
						Total Quantity in tonne	**12700.024**
1.010	OD5431/2024-2025						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T - 3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	2 T to 3 T						
	Ch 260 to 435	1.000	175.000	(28.21+28.21)/2	2/3*2.65		8721.608
	Head as per calculation sheet	1.000	2213.980		2/3*2.65		3911.372
	Rounding	1.000	67.036				67.036
	Total						**12700.016**
						Total Quantity in tonne	**12700.016**
1.011	65.103						
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .						
	Moulding & Supplying 2T						
	Ch 0 to 260	1.000	260.000	(11.07+13.3)/2		1.196000	3789.048
	Rounding	1.000	10.952				10.952
	Total						**3800.000**
						Total Quantity in each	**3800.000**
1.012	65.104						
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site						
	Conveying 2T tetrapod						
	Quantity as per item 11	1.000	3800.000				3800.000
	Total						**3800.000**
						Total Quantity in each	**3800.000**
1.013	OD5432/2024-2025						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer						
	Moulding & supplying 6 T						
	Ch 260 to 435	1.000	175.000	(12+14.2) /2		0.580000	1329.650
	Rounding	1.000	20.350				20.350
	Total						**1350.000**
						Total Quantity in each	**1350.000**
1.014	OD5433/2024-2025						
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	Conveying 6T tetrapod						
	Quantity as per item 13	1.000	1350.000				1350.000
	Total						**1350.000**
						Total Quantity in each	**1350.000**
1.015	65.124						
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.						
	Moulding & Supplying 8T Tetrapods						
	Round Head	1.000	3.14*12.4	17.660		0.480000	330.053
	Rounding	1.000	19.947				19.947
	Total						**350.000**
						Total Quantity in each	**350.000**
1.016	65.125						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	Conveying 8T tetrapod						
	Quantity as per item 15	1.000	350.000				350.000
	Total						**350.000**
						Total Quantity in each	**350.000**
2	Appendix B- Dredging near river training area						
2.001	65.82						
	Deepening the harbour basin and mouth by using dredger having a flow rate of 700 to 1000m3 slurry per hour with a solid output of not less than 127.5 m3/hour and dumping the spoil at location already pointed out by the departmental officers with a lead up to a radial distance of 500m, including hire charges of dredger, all tools and plants and accesories , fuel charges, idling and mobilisation charges, providing and shifting the pipe lines including all labour charges, incidental charges etc. and drtvice taxes complete for a depth upto (-) 4.50m bedlevel with a tolerance of +/- 20cm. Unexpected Error occured Please Login again!! Click here to Login						
	Deepening and Dredging						
	Area between 0 and -1	1.000	7745.080		(3+2)/2		19362.700
	Area between -1 and -2	1.000	5106.141		(2+1)/2		7659.212
	Area between -2 and -3	1.000	7871.094		(1+0)/2		3935.547
	Rounding	1.000	42.541				42.541
	Total						**31000.000**
						Total Quantity in cum	**31000.000**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Dredging And Construction of reclamation Bund-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Dredging**			
1.001	60.7.1			
	DRY RUBBLE MASONRY _ Dry rubble without concrete levelling course masonry with good quality blasted rubble including packing to compactness to lines and levels cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site			
	Net Total	5720.000cum	@3426.06/cum	19597063.20
1.002	OD204/2022-2023			
	Supplying and laying Geotextile (120 grams per sqm membrane) in two layers including joints by stitching, over lapping etc. over sand bag to the land side of the bund including all cost of materials and labour charges etc. complete as per the directions of the departmental officers at site.			
	Net Total	2200.000sqm	@85.11/sqm	187242.00
1.003	65.82			
	Deepening the harbour basin and mouth by using dredger having a flow rate of 700 to 1000m3 slurry per hour with a solid output of not less than 127.5 m3/hour and dumping the spoil at location already pointed out by the departmental officers with a lead up to a radial distance of 500m, including hire charges of dredger, all tools and plants and accesories , fuel charges, idling and mobilisation charges, providing and shifting the pipe lines including all labour charges, incidental charges etc. and drtvice taxes complete for a depth upto (-) 4.50m bedlevel with a tolerance of +/- 20cm. Unexpected Error occured Please Login again!! Click here to Login			
	Net Total	132500.000cum	@182.57/cum	24190525.00
1.004	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	55.526cum	@9237.20/cum	512904.77
1.005	OD5553/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	4159.320kilogram	@96.62/kilogram	401873.50
			Heading Total(Rs)	44889608.47
2	**Reclamation bund**			
2.001	11.1.5			
	Excavation for Structures Earthwork in excavation for structures as per drawing and technical specifications Clause 305.1 including setting out, construction of shoring and bracing, removal of stumps and other deleterious material and disposal upto a lead of 50 m, dressing of sides and bottom and backfilling in trenches with excavated suitable material. V. Marshy soil			
	Net Total	4800.000cum	@1407.08/cum	6753984.00
2.002	12.11			
	Providing and laying filter media with granular crushed aggregates as per specification to a thickness of not less than 600 mm with smaller size towards the soil and bigger size towards the wall and providing over the entire surface behind abutment, wing wall, return wall to the full height, compacted to firm condition complete as per drawing and technical specification Clause 1204.3.8			
	Net Total	360.000cum	@3435.35/cum	1236726.00
			Heading Total(Rs)	7990710.00
			Total Estimation PAC	52880318.47
4	**Extra Charges**			
3.001	Provision for GST			
	52880318.47		18.00%	9518457.32
			Grand Total	62398775.79
			Round off	1224.21
			Rounded Total(Rs)	62400000.00
	Rupees Six Crore Twenty Four Lakh			

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Dredging And Construction of reclamation Bund-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Dredging						
1.001	60.7.1						
	DRY RUBBLE MASONRY _ Dry rubble without concrete levelling course masonry with good quality blasted rubble including packing to compactness to lines and levels cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site						
	DR						
	protection wall along the basin	1.000	400.000	(4+1.2)/2	5.500		5720.000
	Total						**5720.000**
						Total Quantity in cum	**5720.000**
1.002	OD204/2022-2023						
	Supplying and laying Geotextile (120 grams per sqm membrane) in two layers including joints by stitching, over lapping etc. over sand bag to the land side of the bund including all cost of materials and labour charges etc. complete as per the directions of the departmental officers at site.						
	geotextile						
	protection wall along the basin	1.000	400.000		5.500		2200.000
	Total						**2200.000**
						Total Quantity in sqm	**2200.000**
1.003	65.82						
	Deepening the harbour basin and mouth by using dredger having a flow rate of 700 to 1000m3 slurry per hour with a solid output of not less than 127.5 m3/hour and dumping the spoil at location already pointed out by the departmental officers with a lead up to a radial distance of 500m, including hire charges of dredger, all tools and plants and accesories , fuel charges, idling and mobilisation charges, providing and shifting the pipe lines including all labour charges, incidental charges etc. and drtvice taxes complete for a depth upto (-) 4.50m bedlevel with a tolerance of +/- 20cm. Unexpected Error occured Please Login again!! Click here to Login						
	Deepening and Dredging						
	Area between 0 and -1	1.000	30265.610		(3+2)/2		75664.025
	Area between -1 and -2	1.000	25704.216		(2+1)/2		38556.324
	Area between -2 and -3	1.000	36368.372		(1+0)/2		18184.186

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Rounding	1.000	95.465				95.465
	Total						**132500.000**
						Total Quantity in cum	**132500.000**
1.004	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	belt and guard stone works						
	rcc belt along basin	1.000	400.000	1.150	0.100		46.000
	guard stones along basin; 2m c/c	201.000	0.200	0.200	0.600	1.000000	4.824
	Rounding	4.702	1.000	1.000	1.000	1.000000	4.702
	Total						**55.526**
						Total Quantity in cum	**55.526**
1.005	OD5553/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR						
	Steel						
	rcc belt along basin	1.000	400.000	1.150	0.100	80.000000	3680.000
	guard stones along basin; 2m c/c	201.000	0.200	0.200	0.600	80.000000	385.920
	Rounding	0.934	1.000	1.000	1.000	100.000000	93.400
	Total						**4159.320**
						Total Quantity in kilogram	**4159.320**
2	Reclamation bund						
2.001	11.1.5						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Excavation for Structures Earthwork in excavation for structures as per drawing and technical specifications Clause 305.1 including setting out, construction of shoring and bracing, removal of stumps and other deleterious material and disposal upto a lead of 50 m, dressing of sides and bottom and backfilling in trenches with excavated suitable material. V. Marshy soil						
	Reclamation						
	protection wall along the Basin	1.000	400.000	4.000	3.000		4800.000
	Total						**4800.000**
						Total Quantity in cum	**4800.000**
2.002	12.11						
	Providing and laying filter media with granular crushed aggregates as per specification to a thickness of not less than 600 mm with smaller size towards the soil and bigger size towards the wall and providing over the entire surface behind abutment, wing wall, return wall to the full height, compacted to firm condition complete as per drawing and technical specification Clause 1204.3.8						
	for the filter media having 6mm and 20 mm broken stones						
	along basin	1.000	400.000	0.150	6.000		360.000
	Total						**360.000**
						Total Quantity in cum	**360.000**

PRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in kasaragod District -Construction of Wharf and Auction Hall-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Auction hall and wharf**			
1.001	12.22			
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.			
	Net Total	49.000MT	@120610.74/MT	5909926.26
1.002	12.23.3			
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm			
	Net Total	1969.200metre	@6921.99/metre	13630782.71
1.003	OD216/2022-2023			
	Providing and fixing reinforcement using High Corrosion Resistant (HCR) for the RCC works for superstructure including conveying, straightening, cutting, bending and tying in position etc. complete as per drawings, detailed specifications and directions of the Engineer-in-charge.			
	Net Total	184.211MT	@97850.12/MT	18025068.46
1.004	14.1.C.1			
	Furnishing and Placing Reinforced Cement Concrete Grade M30 Using Concrete Mixer in super-structure as per drawing and Technical Specification			
	Net Total	720.000cum	@8928.54/cum	6428548.80
			Heading Total(Rs)	43994326.23
2	**Auction hall- beams and slabs**			
2.001	10.22			
	Welding by gas or electric plant including transportation of plant at site etc. complete.			
	Net Total	80500.000cm	@3.90/cm	313950.00
2.002	OD220/2022-2023			
	Extra for addition of synthetic polyester triangular fibre of length 12 mm, effective diameter 10-40 microns and specific gravity of 1.34 to 1.40 in cement concrete/RCC/ Flooring / water retaining structures by using 125 gms of synthetic polyester triangular fibre for 50 kgs cement used as per directions of Engineer -in- Charge based on 4.18			
	Net Total	300.000kg	@564.07/kg	169221.00

Sl No	Specification	Quantity	Rate	Amount
2.003	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	1050.000sqm	@800.47/sqm	840493.50
2.004	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	540.000sqm	@637.63/sqm	344320.20
2.005	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	290.000sqm	@847.44/sqm	245757.60
2.006	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	1955.000sqm	@262.57/sqm	513324.35
2.007	13.7.1			
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	1005.000sqm	@393.71/sqm	395678.55
2.008	OD1854/2022-2023			
	Providing and fixing Ist quality ceramic glazed wall tiles conforming to IS: 15622(thickness to be specified by the manufacturer), of approved make, in all colours,shades except burgundy, bottle green, black of any size as approved by Engineerin-Charge,in skirting, risers of steps and dados, over 12 mm thick bed of cementmortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @3.3kg per sqm, including pointing in white cement mixed with pigment of matchingshade complete. (Based on 8.31 DAR)			
	Net Total	120.000sqm	@1190.03/sqm	142803.60
2.009	OD215/2022-2023			
	Providing and laying industrial floor tiles (12 mm thickness textured) of 1st quality conforming to IS :4457 of approved make ,in clours such as white ,ivory ,grey, fume red brown ,laid on 20 mm thick cement mortar 1:4 (1 cement:4 coarse sand), including pointing the joints with white cement and matching pigment etc .' complete Details of cost for 1 sqm MATERIAL Industrial floor tiles 300x300 mm size = 1 sqm Add for wastage & breakage @ 2.5% = 0.025 sqm Total = 1.025 sqm			
	Net Total	900.000sqm	@1903.73/sqm	1713357.00
2.010	OD221/2022-2023			
	wearing coat on deck slab using cement concrete 1:1.5:3 using 15mm broken stone for a thickness of 50mm including finishing with abrasion resistant hard top or equivalent chemical confirming to IS 1237 C-1980 &4kg/m2 of flooring including floated hard and trowelled smooth in 2 layers inclusive of all labour charges etc and including provision for making necessary grooves			

Sl No	Specification	Quantity	Rate	Amount
	for various joints but excluding cost of joint fillior and labour charges for filling."			
	Net Total	1300.000sqm	@652.60/sqm	848380.00
2.011	13.43.1			
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer			
	Net Total	1765.000sqm	@69.33/sqm	122367.45
2.012	13.46.1			
	Finishing walls with Acrylic Smooth exterior paint of required shade:New work (Two or more coat applied @ 1.67 ltr/10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/10 sqm)			
	Net Total	1004.400sqm	@190.25/sqm	191087.10
2.013	13.44.1			
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)			
	Net Total	1852.000sqm	@105.36/sqm	195126.72
	Heading Total(Rs)			6035867.07
	Total Estimation PAC			50030193.30
4	**Extra Charges**			
3.001	Provision for GST			
	50030193.30		18.00%	9005434.79
	Grand Total			59035628.09
	Round off			64371.91
	Rounded Total(Rs)			59100000.00
	Rupees Five Crore Ninety One Lakh			

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in kasaragod District -Construction of Wharf and Auction Hall-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Auction hall and wharf						
1.001	12.22						
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.						
	Auction hall						
	MS liner for wharf	2*24	6.000	3.14*.75		0.047100	31.945
	auction hall	2*12	6.000	3.14*.75		0.047100	15.973
	Rounding	1.000	1.082				1.082
	Total						**49.000**
						Total Quantity in MT	**49.000**
1.002	12.23.3						
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm						
	Auction hall						
	auction hall (upto +1.6m CD level)	2*12			25.75+1.6		656.400
	Total						**656.400**
	wharf						
	wharf (upto +1.6m CD level)	2*24			25.75+1.6		1312.800
	Total						**1312.800**
						Total Quantity in metre	**1969.200**
1.003	OD216/2022-2023						
	Providing and fixing reinforcement using High Corrosion Resistant (HCR) for the RCC works for superstructure including conveying, straightening, cutting, bending and tying in position etc. complete as per drawings, detailed specifications and directions of the Engineer-in-charge.						
	Auction hall & wharf piles						
	25 mm Dia rft	2*36*8	27.350			0.003850	60.651
	lap 25mm	2*36*8*2	1.000			0.003850	4.435

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	10 mm stirrups at 20cm c/c	2*36*125	3.140	0.650		0.000620	11.389
	stiffner 12mm	2*36*6	3.140	0.650		0.000890	0.785
	Total						**77.260**
	Auction hall-beam and slab						
	main beam for auction hall LS Wt taken @ 120Kg/m3	2.000	60.000	0.300	0.550	0.120000	2.376
	main beam for Wharf @ 120Kg/m3	2.000	120.000	0.300	0.550	0.120000	4.752
	Cross Beam @ 120Kg/m3	12.000	13.000	0.300	0.550	0.120000	3.089
	end beam for auction hall @ 120Kg/m3	24.000	6.600	0.300	0.550	0.120000	3.136
	Deck slab for auction hall @ 120Kg/m3	1.000	60.000	20.000	0.200	0.120000	28.800
	wharf @ 120Kg/m3	1.000	60.000	6.500	0.200	0.120000	9.360
	-do-	1.000	60.000	6.600	0.200	0.120000	9.504
	Facia wall @ 120Kg/m3	1.000	120.000	0.200	1.500	0.120000	4.320
	rounding	1.000	1.614				1.614
	Total						**66.951**
	Auction Hall						
	Column @ 150 kg/m3	2*12	0.400	0.400	4.500	0.150000	2.592
	Column @ 150 kg/m3	1*12	0.400	0.400	6.000	0.150000	1.728
	Beams @ 150 kg/m3	3.000	60.000	0.300	0.550	0.150000	4.455
	Beams @ 150 kg/m3	12*2	6.150	0.350	0.550	0.150000	4.262
	Beams @ 150 kg/m3	2.000	62.000	8.100	0.175	0.150000	26.366
	Rounding	1.000	0.597				0.597
	Total						**40.000**
						Total Quantity in MT	**184.211**
1.004	14.1.C.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Furnishing and Placing Reinforced Cement Concrete Grade M30 Using Concrete Mixer in super-structure as per drawing and Technical Specification						
	Auction hall-beam and slab						
	main beam for auction hall LS Wt taken as 120	12*2	6.000	0.300	0.550		23.760
	Cross Beam	12*4	5.200	0.300	0.550		41.184
	end beam for auction hall	12.000	5.000	0.300	0.550		9.900
	Deck slab for auction hall	1.000	60.000	15.000	0.175		157.500
	wharf beam	12*2	5.000	0.300	0.550		19.800
		12*2	5.200	0.300	0.550		20.592
	wharf	1.000	60.000	5.000	0.175		52.500
	wharf	1.000	60.000	6.600	0.175		69.300
	Facia wall	1.000	120.000	0.200	1.500		36.000
	Column	2*20	0.400	0.400	4.500		28.800
	Column	20.000	0.400	0.400	6.000		19.200
	Beam	3.000	60.000	0.300	0.550		29.700
	Beam	12*2	6.150	0.350	0.550		28.413
	Slab	2.000	62.000	8.100	0.175		175.770
	Slab	1.000	7.581				7.581
	Total						**720.000**
						Total Quantity in cum	**720.000**
2	Auction hall- beams and slabs						
2.001	10.22						
	Welding by gas or electric plant including transportation of plant at site etc. complete.						
	piles						
	lap 25mm	72*8*2*4					4608.000
	10 mm stirrups at 20cm c/c	72*125*8					72000.000
	stiffner 12mm c/c	72*6*8					3456.000
	Rounding	436.000					436.000
	Total						**80500.000**
						Total Quantity in cm	**80500.000**
2.002	OD220/2022-2023						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Extra for addition of synthetic polyester triangular fibre of length 12 mm, effective diameter 10-40 microns and specific gravity of 1.34 to 1.40 in cement concrete/RCC/ Flooring / water retaining structures by using 125 gms of synthetic polyester triangular fibre for 50 kgs cement used as per directions of Engineer -in- Charge based on 4.18						
	Synthetic Fibre - slab						
	Deck slab for auction hall (406.67x0.125/50 = 1.017)	1.000	60.000	15.000	0.175	1.017000	160.178
	wharf (406.67x0.125/50 = 1.017)	1.000	60.000	5.000	0.175	1.017000	53.393
	wharf (406.67x0.125/50 = 1.017)	1.000	60.000	6.600	0.175	1.017000	70.478
	Rounding	1.000	15.951				15.951
	Total						**300.000**
						Total Quantity in kg	**300.000**
2.003	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	slab						
	slab	2.000	62.000	8.100			1004.400
	rounding	1.000	24.900				24.900
	Total						**1029.300**
	beam						
		-2.000	60.000	0.300			-36.000
		12.000	13.500	0.350			56.700
	Total						**20.700**
						Total Quantity in sqm	**1050.000**
2.004	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	beam						
		3.000	60.000	1.400			252.000
		12*2	8.100	1.450			281.880
	rounding	1.000	6.120				6.120
	Total						**540.000**
						Total Quantity in sqm	**540.000**
2.005	5.9.6						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	Auction hall column						
	columns	2*12	1.600		4.500		172.800
		12.000	1.600		6.000		115.200
	rounding	1.000	2.000				2.000
	Total						**290.000**
						Total Quantity in sqm	**290.000**
2.006	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	Auction hall						
	column	2*20	1.600		4.500		288.000
	column	20.000	1.600		6.000		192.000
	beam	3.000	60.000	1.400			252.000
	beam	12*2	6.150	1.450			214.020
	slab	2.000	62.000	8.100			1004.400
	rounding	1.000	4.580				4.580
	Total						**1955.000**
						Total Quantity in sqm	**1955.000**
2.007	13.7.1						
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)						
	slab						
		2.000	62.000	8.100			1004.400
	rounding	1.000	0.600				0.600
	Total						**1005.000**
						Total Quantity in sqm	**1005.000**
2.008	OD1854/2022-2023						
	Providing and fixing Ist quality ceramic glazed wall tiles conforming to IS: 15622(thickness to be specified by the manufacturer), of approved make, in all colours,shades except burgundy, bottle green, black of any size as approved by Engineerin-Charge,in skirting, risers of steps and dados, over 12 mm thick bed of cementmortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @3.3kg per sqm, including pointing in white cement mixed with pigment of matchingshade complete. (Based on 8.31 DAR)						
	For Column						
	Column	3*12	1.600	2.000		1.000000	115.200
	rounding	1.000	4.800				4.800
	Total						**120.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in sqm	**120.000**
2.009	OD215/2022-2023						
	Providing and laying industrial floor tiles (12 mm thickness textured) of 1st quality conforming to IS :4457 of approved make ,in clours such as white ,ivory ,grey, fume red brown ,laid on 20 mm thick cement mortar 1:4 (1 cement:4 coarse sand), including pointing the joints with white cement and matching pigment etc .' complete Details of cost for 1 sqm MATERIAL Industrial floor tiles 300x300 mm size = 1 sqm Add for wastage & breakage @ 2.5% = 0.025 sqm Total = 1.025 sqm						
	Auction hall						
		1.000	60.000	15.000			900.000
	Total						**900.000**
						Total Quantity in sqm	**900.000**
2.010	OD221/2022-2023						
	wearing coat on deck slab using cement concrete 1:1.5:3 using 15mm broken stone for a thickness of 50mm including finishing with abrasion resistant hard top or equivalent chemical confirming to IS 1237 C-1980 &4kg/m2 of flooring including floated hard and trowelled smooth in 2 layers inclusive of all labour charges etc and including provision for making necessary grooves for various joints but excluding cost of joint fillior and labour charges for filling."						
	wharf						
		60.000	15.000				900.000
		60.000	6.600				396.000
	rounding	1.000	4.000				4.000
	Total						**1300.000**
						Total Quantity in sqm	**1300.000**
2.011	13.43.1						
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	Auction hall						
	column	2*20	1.600		2.500		160.000
	column	20.000	1.600		4.000		128.000
	beam	3.000	60.000	1.400			252.000
	beam	12*2	6.150	1.450			214.020
	slab	2.000	62.000	8.100			1004.400
	rounding	1.000	6.580				6.580
	Total						**1765.000**
						Total Quantity in sqm	**1765.000**
2.012	13.46.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Finishing walls with Acrylic Smooth exterior paint of required shade:New work (Two or more coat applied @ 1.67 ltr/10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/10 sqm)						
	slab						
		2.000	62.000	8.100			1004.400
	Total						**1004.400**
						Total Quantity in sqm	**1004.400**
2.013	13.44.1						
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)						
	Auction hall						
	column	2*20	1.600		2.500		160.000
	column	20.000	1.600		4.000		128.000
	beam	3.000	60.000	1.400			252.000
	beam	12*2	6.150	1.450			214.020
	slab	2.000	62.000	8.100			1004.400
	rounding	1.000	5.920				5.920
	Total						**1764.340**
	deduction -beam						
		2.000	60.000	0.300			36.000
		12*2.000	6.150	0.350			51.660
	Total						**87.660**
						Total Quantity in sqm	**1852.000**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Construction of Canteen, Rest shed, Locker room and gear shed-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Locker Rooms, Shop Rooms, Canteen & Net mending shed**			
1.001	2.31			
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared			
	Net Total	1000.000sqm	@14.48/sqm	14480.00
1.002	2.33.1			
	Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth			
	Net Total	10.000each	@439.60/each	4396.00
1.003	2.8.1			
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil			
	Net Total	790.000cum	@291.42/cum	230221.80
1.004	OD1735/2022-2023			
	Coconut Pile - Supplying and stacking well matured straight coconut post for driving down through various strata bellow bed level including cost conveyance labor charges etc complete.			
	Net Total	1800.000metre	@136.76/metre	246168.00
1.005	OD149/2022-2023			
	OD 6380 / 2020-2021 : Coconut Pile - Driving down coconut pile to lines and levels through soft to medium clay soil strata including all hire charges and labour and all other appliances necessary for pile driving down after pointing the bottom end. Details for one post of 6m long 15 numbers per day 6X15 = 90m Details for 90m length			
	Net Total	1800.000metre	@213.34/metre	384012.00
1.006	OD1736/2022-2023			
	Bailing out water Using 5HP Pump- Bailing out water with 5HP engine and pump set including conveyance to site and erection, cost of fuel, lubrication oil and other			

Sl No	Specification	Quantity	Rate	Amount
	stores, pay of staff etc complete			
	Net Total	240.000hour	@372.81/hour	89474.40
1.007	60.7.2			
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.			
	Net Total	122.000cum	@2557.65/cum	312033.30
1.008	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	175.000cum	@6687.21/cum	1170261.75
1.009	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	73.000cum	@7069.78/cum	516093.94
1.010	50.2.25.1			
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge			
	Net Total	200.000cum	@515.98/cum	103196.00
1.011	5.1.2			
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size			
	Net Total	118.000cum	@8914.94/cum	1051962.92
1.012	5.2.2			
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)			
	Net Total	52.000cum	@10748.82/cum	558938.64
1.013	5.3			
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	271.000cum	@11277.61/cum	3056232.31
1.014	5.22.6			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - Mechanically Treated bars of grade Fe-500D or more			
	Net Total	53700.000kilogram	@96.46/kilogram	5179902.00
1.015	10.6.2			
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.20 mm M.S. laths with 1.20 mm thick top cover			
	Net Total	100.000sqm	@3238.32/sqm	323832.00
1.016	10.7			
	Providing and fixing ball bearing for rolling shutters.			
	Net Total	24.000no	@484.97/no	11639.28
1.017	50.6.1.5			
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x20cm or nearest available size confirming to IS 2185 Part I of 1979 for super structure up to floor two level thickness 20cm and above in: CM 1:6 (1 cement : 6 coarse sand) etc complete			
	Net Total	180.000cum	@6580.80/cum	1184544.00
1.018	50.6.2.1			
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x15 cm or nearest available size confirming to IS 2185 part I of 1979 for foundation and plinth with thickness 15cm in: CM 1:6 (1 cement :6 coarse sand) etc complete			
	Net Total	15.000cum	@6179.60/cum	92694.00
1.019	9.1.1			
	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately).Second class teak wood			
	Net Total	2.300cum	@150367.20/cum	345844.56
1.020	9.7.1			
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick:Second class teak wood			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	25.000sqm	@3398.47/sqm	84961.75
1.021	9.9.1.2			
	Providing and fixing glazed shutters for door, windows and clerestory windows using 4 mm thick float glass panes including ISI marked M.S. Pressed butt hinges bright finished of required size with necessary screws.30 mm thick			
	Net Total	53.000sqm	@4575.39/sqm	242495.67
1.022	9.48.2			
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc			
	Net Total	830.000kg	@211.94/kg	175910.20
1.023	9.53			
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	188.000each	@207.00/each	38916.00
1.024	13.1.1			
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	1290.000sqm	@308.22/sqm	397603.80
1.025	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	1945.000sqm	@262.57/sqm	510698.65
1.026	13.11			
	18 mm cement plaster in two coats under layer 12 mm thick cement plaster 1:5 (1 cement : 5 coarse sand) finished with a top layer 6 mm thick cement plaster 1:6 (1 cement : 6 fine sand).			
	Net Total	1255.000sqm	@461.20/sqm	578806.00
1.027	11.41.2			
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.			
	Net Total	590.000sqm	@1733.20/sqm	1022588.00
1.028	OD156/2022-2023			
	Providing and laying industrial floor tiles (12 mm thickness textured) of 1st quality conforming to IS :4457 of approved make ,in clours such as white ,ivory ,grey, fume red brown ,laid on 20 mm thick cement mortar 1:4 (1 cement:4 coarse sand), including pointing the joints with white cement and matching pigment etc .' complete Details of cost for 1 sqm MATERIAL Industrial floor tiles 300x300 mm size = 1 sqm Add for wastage & breakage @ 2.5% = 0.025			

Sl No	Specification	Quantity	Rate	Amount
	sqm Total = 1.025 sqm			
	Net Total	260.000sqm	@1903.73/sqm	494969.80
1.029	9.97.3			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm			
	Net Total	28.000no	@103.95/no	2910.60
1.030	50.9.15.1			
	Supplying and fixing 200 mm Aluminium aldrop			
	Net Total	14.000no	@171.51/no	2401.14
1.031	9.100.2			
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm			
	Net Total	14.000no	@61.02/no	854.28
1.032	50.9.15.4			
	Providing and fixing iron hooks and eyes: 150 mm			
	Net Total	52.000no	@16.42/no	853.84
1.033	50.9.15.5			
	Providing and fixing iron hooks and eyes: 100 mm			
	Net Total	156.000no	@14.10/no	2199.60
1.034	13.37.1			
	White washing with lime to give an even shade:New work (three or more coats)			
	Net Total	3808.418sqm	@32.96/sqm	125525.46
1.035	13.44.1			
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)			
	Net Total	3808.418sqm	@105.36/sqm	401254.92
1.036	13.62.1			
	Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade:Two or more coats on new work over an under coat of suitable shade with ordinary paint of approved brand and manufacture .			
	Net Total	370.000sqm	@204.63/sqm	75713.10
1.037	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	210.000sqm	@329.03/sqm	69096.30
1.038	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended			

Sl No	Specification	Quantity	Rate	Amount
	floors, roofs, landings, balconies and access platform			
	Net Total	1100.000sqm	@800.47/sqm	880517.00
1.039	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	1162.000sqm	@637.63/sqm	740926.06
1.040	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	365.000sqm	@847.44/sqm	309315.60
1.041	5.9.16.1			
	Centering and shuttering including strutting, etc. and removal of form for: Edges of slabs and breaks in floors and wallsUnder 20 cm wide			
	Net Total	225.000metre	@200.11/metre	45024.75
	Heading Total(Rs)			21079469.42
	Total Estimation PAC			21079469.42
3	**Extra Charges**			
2.001	Provision for GST			
	21079469.42		18.00%	3794304.50
	Grand Total			24873773.92
	Round off			26226.08
	Rounded Total(Rs)			24900000.00
	Rupees Two Crore Forty Nine Lakh			

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Construction of Canteen, Rest shed, Locker room and gear shed-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Locker Rooms, Shop Rooms, Canteen & Net mending shed						
1.001	2.31						
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared						
	for Net mending shed and locker rooms						
	Net mending shed and locker rooms	1.000	50.000	20.000			1000.000
	Total						**1000.000**
						Total Quantity in sqm	**1000.000**
1.002	2.33.1						
	Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth						
	Trees						
	Trees	10.000					10.000
	Total						**10.000**
						Total Quantity in each	**10.000**
1.003	2.8.1						
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil						
	for wall						
	long wall	3.000	44.000	1.800	1.950		463.320
	cross wall	14*2	3.200	1.800	1.950		314.496
	Rounding	1.000	12.183				12.183
	Rounding	1.000	0.001				0.001
	Total						**790.000**
						Total Quantity in cum	**790.000**
1.004	OD1735/2022-2023						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Coconut Pile - Supplying and stacking well matured straight coconut post for driving down through various strata bellow bed level including cost conveyance labor charges etc complete.						
	For Net mending shed and locker rooms						
	Foundation	450.000	4.000			1.000000	1800.000
	Total						**1800.000**
						Total Quantity in metre	**1800.000**
1.005	OD149/2022-2023						
	OD 6380 / 2020-2021 : Coconut Pile - Driving down coconut pile to lines and levels through soft to medium clay soil strata including all hire charges and labour and all other appliances necessary for pile driving down after pointing the bottom end. Details for one post of 6m long 15 numbers per day 6X15 = 90m Details for 90m length						
	for foundation						
	for foundation	450.000	4.000				1800.000
	Total						**1800.000**
						Total Quantity in metre	**1800.000**
1.006	OD1736/2022-2023						
	Bailing out water Using 5HP Pump- Bailing out water with 5HP engine and pump set including conveyance to site and erection, cost of fuel, lubrication oil and other stores, pay of staff etc complete						
	For Net mending shed and locker rooms						
	Foundation (Footing)	30.000	8.000			1.000000	240.000
	Total						**240.000**
						Total Quantity in hour	**240.000**
1.007	60.7.2						
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.						
	for wall						
	long wall	3.000	44.000	1.800	0.300		71.280
	cross wall	14*2	3.200	1.800	0.300		48.384
	rounding	1.000	2.336				2.336
	Total						**122.000**
						Total Quantity in cum	**122.000**
1.008	4.1.8						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	strip footing bottom						
	Long wall	3.000	44.000	1.800	0.150		35.640
	cross wall	14*2	3.200	1.800	0.150		24.192
	rounding	1.000					1.000
	Total						**60.832**
	RR masonry bottom						
	Long wall	3.000	44.000	0.750	0.150		14.850
	cross wall	14*2	4.250	0.750	0.150		13.388
	rounding	1.000	1.928				1.928
	Total						**30.166**
	flooring						
	net mending shed	1.000	23.200	10.000	0.100		23.200
	locker and shop rooms	1.000	3.100	3.500	0.100		1.085
	verandah	2.000	16.200	1.500	0.100		4.860
	step	2*2	45.000	0.300	1.000		54.000
	rounding	1.000	0.857	1.000	1.000		0.857
	Total						**84.002**
						Total Quantity in cum	**175.000**
1.009	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	RR masonry						
	Long wall	3.000	44.000	0.450	0.600		35.640
	cross wall	14*2	4.550	0.450	0.600		34.398
	rounding	1.000	2.962				2.962
	Total						**73.000**
						Total Quantity in cum	**73.000**
1.010	50.2.25.1						
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge						
	filling						
	net mending shed	1.000	23.000	10.000	0.500		115.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	locker and shop rooms	10.000	3.100	3.500	0.500		54.250
	veranda	2.000	16.200	1.500	0.500		24.300
	rounding	1.000	6.450				6.450
	Total						**200.000**
						Total Quantity in cum	**200.000**
1.011	5.1.2						
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size						
	strip footing						
	long wall	3.000	44.000	1.500	0.200		39.600
	long wall	3.000	44.000	0.300	0.250		9.900
	cross wall	14*2	3.500	1.500	0.200		29.400
	cross wall	14*2	3.500	0.300	0.250		7.350
	Total						**86.250**
	plinth beam						
	long wall	3.000	44.000	0.300	0.450		17.820
	cross wall	14*2	5.000	0.300	0.300		12.600
	rpounding	1.000	1.330				1.330
	Total						**31.750**
						Total Quantity in cum	**118.000**
1.012	5.2.2						
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)						
	column						
	GF	3*14	0.450	0.300	5.500		31.185
	FF	3*14	0.450	0.300	3.500		19.845
	rounding	1.000	0.970		1.000		0.970
	Total						**52.000**
						Total Quantity in cum	**52.000**
1.013	5.3						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).						
	GF lintel, sunshade						
	GF sunshade	1.000	112.000	0.900	0.080		8.064
	GF lintel all round	1.000	108.400	0.200	0.200		4.336
	locker and shop rooms front side	2.000	16.800	0.200	0.200		1.344
	do- cross wall	4.000	7.000	0.200	0.150		0.840
	do- long wall	4.000	16.800	0.200	0.150		2.016
	stair room	2.000	32.000	0.200	0.150		1.920
	Total						**18.520**
	GF roof slabs						
	GF	1.000	46.200	11.200	0.150		77.616
	Stair landing	2.000	5.500	1.500	0.150		2.475
		2.000	2.500	1.500	0.150		1.125
		2.000	3.100	1.500	0.150		1.395
	step	2*25	1.500	0.300	0.150		3.375
	Deduct stair room roof	-1.000	4.800	11.200	0.150		-8.064
	Total						**77.922**
	GF beams						
	GF 1	14.000	10.000	0.300	0.500		21.000
	GF 2	3.000	45.000	0.300	0.350		14.175
	Total						**35.175**
	FF lintel, sunshade						
	FF sunshade	1.000	112.000	0.900	0.080		8.064
	FF lintel all round	1.000	108.400	0.200	0.200		4.336
	lintel rooms front side	2.000	16.800	0.200	0.200		1.344
	do-cross wall	4.000	7.000	0.200	0.150		0.840
	do-long wall	1.000	16.800	0.200	0.150		0.504
	stair room	2.000	32.000	0.200	0.150		1.920
	Total						**17.008**
	FF roof slabs						
	FF	1.000	46.200	11.200	0.150		77.616

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	stair landing	2.000	5.500	1.500	0.150		2.475
		2.000	2.500	1.500	0.150		1.125
		2.000	3.100	1.500	0.150		1.395
	step	2*25	1.500	0.300	0.150		3.375
	Total						**85.986**
	FF beams						
	FF 1	14.000	10.000	0.300	0.500		21.000
	FF 2	3.000	45.000	0.300	0.350		14.175
	rounding	1.000	1.214				1.214
	Total						**36.389**
						Total Quantity in cum	**271.000**
1.014	5.22.6						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - Mechanically Treated bars of grade Fe-500D or more						
	Strip footing						
	for strip footing	1.000	86.250			120.000000	10350.000
	Total						**10350.000**
	Plinth beam						
	for Plinth beam	1.000	31.750			150.000000	4762.500
	Total						**4762.500**
	Column						
	for column	1.000	52.000			150.000000	7800.000
	Total						**7800.000**
	GF lintel, sunshade						
	for GF lintel, sunshade	1.000	18.520			100.000000	1852.000
	Total						**1852.000**
	GF Roof slab						
	for GF Roof slab	1.000	77.922			100.000000	7792.200
	Total						**7792.200**
	GF beams						
	for GF beams	1.000	35.175			150.000000	5276.250
	Total						**5276.250**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	FF lintel, Sunshade						
	for FF lintel, Sunshade	1.000	17.008			100.000000	1700.800
	Total						**1700.800**
	FF roof slab						
	for FF roof slab	1.000	85.986			100.000000	8598.600
	Total						**8598.600**
	FF beams						
	for FF beams	1.000	36.389			150.000000	5458.350
	Total						**5458.350**
	Rounding						
		1.000	109.300				109.300
	Total						**109.300**
						Total Quantity in kilogram	**53700.000**
1.015	10.6.2						
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.20 mm M.S. laths with 1.20 mm thick top cover						
	RS						
	FF	10.000	3.100	2.400			74.400
	GF	2.000	4.800	2.400			23.040
	rounding	1.000	2.560				2.560
	Total						**100.000**
						Total Quantity in sqm	**100.000**
1.016	10.7						
	Providing and fixing ball bearing for rolling shutters.						
	GF						
	GF	12*2					24.000
	Total						**24.000**
						Total Quantity in no	**24.000**
1.017	50.6.1.5						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x20cm or nearest available size confirming to IS 2185 Part I of 1979 for super structure up to floor two level thickness 20cm and above in: CM 1:6 (1 cement : 6 coarse sand) etc complete						
	GF						
	net mending shed above lintel level	1.000	56.000	0.200	0.600		6.720
	locker and shop rooms	5.000	7.000	0.200	3.100		21.700
		3.000	15.000	0.200	3.250		29.250
	verandah	2.000	15.000	0.200	0.600		3.600
	stair room	1.000	34.000	0.200	9.000		61.200
	Total						**122.470**
	Deduction GF						
	RS	-10.000	3.100	0.200	2.400		-14.880
		-2.000	4.800	0.200	2.400		-4.608
	Total						**-19.488**
	FF						
	canteen	1.000	56.000	0.200	3.100		34.720
	verandah above lintel level	2.000	15.000	0.200	0.900		5.400
	rooms	5.000	7.000	0.200	3.100		21.700
		3.000	15.000	0.200	3.250		29.250
	Total						**91.070**
	Deduction FF						
	D 90X120	-14.000	0.900	0.200	1.200		-3.024
	W3 150X150	-26.000	1.500	0.200	1.500		-11.700
	Total						**-14.724**
	rounding						
		1.000	0.672				0.672
	Total						**0.672**
						Total Quantity in cum	**180.000**
1.018	50.6.2.1						
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x15 cm or nearest available size confirming to IS 2185 part I of 1979 for foundation and plinth with thickness 15cm in: CM 1:6 (1 cement :6 coarse sand) etc complete						
	parapet						
	parapet	1.000	115.000	0.150	0.700		12.075

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	2.925				2.925
	Total						**15.000**
						Total Quantity in cum	**15.000**
1.019	9.1.1						
	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately).Second class teak wood						
	First floor						
	D 90x210	14.000	37.632/1000			1.000000	0.527
	W3 150x150	26.000	66.460/1000			1.000000	1.728
	Rounding	1.000	0.045			1.000000	0.045
	Total						**2.300**
						Total Quantity in cum	**2.300**
1.020	9.7.1						
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick:Second class teak wood						
	Door						
	D 90X120	14.000	1.591				22.274
	rounding	1.000	2.726				2.726
	Total						**25.000**
						Total Quantity in sqm	**25.000**
1.021	9.9.1.2						
	Providing and fixing glazed shutters for door, windows and clerestory windows using 4 mm thick float glass panes including ISI marked M.S. Pressed butt hinges bright finished of required size with necessary screws.30 mm thick						
	window						
	W3 150X150	26.000	1.940				50.440
	rounding	1.000	2.560				2.560
	Total						**53.000**
						Total Quantity in sqm	**53.000**
1.022	9.48.2						
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	window						
	W3 150X150	26.000	13.000	1.500	1.560		790.920
	add 5%	1.000	36.000				36.000
	rounding	1.000	3.080				3.080
	Total						**830.000**
						Total Quantity in kg	**830.000**
1.023	9.53						
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	hold fast						
	D 90X120	14.000	6.000				84.000
	W3 150X150	26.000	4.000				104.000
	Total						**188.000**
						Total Quantity in each	**188.000**
1.024	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	Inside wall						
	locker and shop rooms	10.000	13.200		3.100		409.200
	verandah	2*2	15.000		0.600		36.000
	net mending shed - above lintel level	1.000	56.000		0.600		33.600
	strair room	2.000	18.700		9.000		336.600
	canteen	1.000	66.000		3.100		204.600
	rooms	10.000	13.200		3.100		409.200
	Passage	1.000	13.500		3.000		40.500
	rounding	1.000	2.700				2.700
	Total						**1472.400**
	Deductions						
	D 90x210	-14.000	0.900		2.100		-26.460
	R S	-10.000	3.100		2.400		-74.400
		-2.000	4.800		2.400		-23.040
	window	-26.000	1.500		1.500		-58.500
	Total						**-182.400**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in sqm	**1290.000**
1.025	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	ceiling-ground floor						
	net mending shed	1.000	23.200	10.000			232.000
	stair room	2.000	9.400	4.800			90.240
	verandah- GF	2.000	16.200	1.450			46.980
	shop rooms and locker rooms	10.000	3.100	3.500			108.500
	sunshade	1.000	113.600	0.900			102.240
	rounding	1.000	5.519				5.519
	Total						**585.479**
	ceiling-first floor						
	canteen	1.000	23.200	10.000			232.000
	verandah	2.000	16.200	1.450			46.980
	rooms	10.000	3.100	3.500			108.500
	sunshade	1.000	113.600	0.900			102.240
	rounding	1.000	5.519				5.519
	Total						**495.239**
	column						
	Ground floor	3*14	1.500		3.100		195.300
	First floor	3*14	1.500		3.100		195.300
	rounding	1.000	10.000				10.000
	Total						**400.600**
	ground floor-beams						
	GF 1	14.000	10.000	1.000			140.000
	GF 2	3.000	45.000	0.600			81.000
	rounding	1.000	10.000				10.000
	Total						**231.000**
	FF beams						
	FF 1	14.000	10.000	1.000			140.000
	FF 2	3.000	45.000	0.600			81.000
	rounding	1.000	11.682				11.682
	Total						**232.682**
						Total Quantity in sqm	**1945.000**
1.026	13.11						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	18 mm cement plaster in two coats under layer 12 mm thick cement plaster 1:5 (1 cement : 5 coarse sand) finished with a top layer 6 mm thick cement plaster 1:6 (1 cement : 6 fine sand).						
	outer wall						
	ground floor	1.000	110.000		0.600		66.000
	ground floor	1.000	110.000		3.100		341.000
	rounding	1.000					1.000
	Total						**408.000**
	parappet,roof top						
	first floor	2.000	111.000		0.750		166.500
	roof slap top	1.000	45.400		10.400		472.160
	sunshade top	2.000	113.600		0.900		204.480
	rounding	1.000	3.860				3.860
	Total						**847.000**
						Total Quantity in sqm	**1255.000**
1.027	11.41.2						
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.						
	Flooring						
	shop room and locker room	10.000	3.500	3.100			108.500
	verandah - GF	2.000	16.200	1.500			48.600
	Step	2*25	1.500	0.300			22.500
		2*25	1.500	0.150			11.250
	Landing	2*3	1.500	1.500			13.500
	Canteen	1.000	23.200	9.600			222.720
	rooms	10.000	3.500	3.100			108.500
	verandah	2.000	16.200	1.500			48.600
	rounding	1.000	5.830				5.830
	Total						**590.000**
						Total Quantity in sqm	**590.000**
1.028	OD156/2022-2023						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and laying industrial floor tiles (12 mm thickness textured) of 1st quality conforming to IS :4457 of approved make ,in clours such as white ,ivory ,grey, fume red brown ,laid on 20 mm thick cement mortar 1:4 (1 cement:4 coarse sand), including pointing the joints with white cement and matching pigment etc .' complete Details of cost for 1 sqm MATERIAL Industrial floor tiles 300x300 mm size = 1 sqm Add for wastage & breakage @ 2.5% = 0.025 sqm Total = 1.025 sqm						
	flooring						
	net mending shed	1.000	23.200	10.000		1.000000	232.000
	rounding	1.000	28.000			1.000000	28.000
	Total						**260.000**
						Total Quantity in sqm	**260.000**
1.029	9.97.3						
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm						
	150mm						
	Doors	14.000	2.000				28.000
	Total						**28.000**
						Total Quantity in no	**28.000**
1.030	50.9.15.1						
	Supplying and fixing 200 mm Aluminium aldrop						
	doors						
	Doors	14.000	1.000				14.000
	Total						**14.000**
						Total Quantity in no	**14.000**
1.031	9.100.2						
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm						
	doors						
	Doors	14.000	1.000				14.000
	Total						**14.000**
						Total Quantity in no	**14.000**
1.032	50.9.15.4						
	Providing and fixing iron hooks and eyes: 150 mm						
	Windows						
		26.000	2.000				52.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**52.000**
						Total Quantity in no	**52.000**
1.033	50.9.15.5						
	Providing and fixing iron hooks and eyes: 100 mm						
	windows						
		26.000	3.000	2.000			156.000
	Total						**156.000**
						Total Quantity in no	**156.000**
1.034	13.37.1						
	White washing with lime to give an even shade:New work (three or more coats)						
	inside wall						
	locker and shop rooms	10.000	13.200		3.100		409.200
	verandah	2*2	15.000		0.600		36.000
	net mending shed - above lintel level	1.000	56.000		0.600		33.600
	strair room	2.000	18.700		9.000		336.600
	canteen	1.000	66.000		3.100		204.600
	rooms	10.000	13.200		3.100		409.200
	Passage	1.000	13.500		3.000		40.500
	rounding	1.000					1.000
	Total						**1470.700**
	Deductions						
	D 90x210	-14.000	0.900		2.100		-26.460
	R S	-10.000	3.100		2.400		-74.400
		-2.000	4.800		2.400		-23.040
	window	-26.000	1.500		1.500		-58.500
	Total						**-182.400**
	ceiling-ground floor						
	net mending shed	1.000	23.200	10.000			232.000
	stair room	2.000	9.400	4.800			90.240
	verandah- GF	2.000	16.200	1.450			46.980
	shop rooms and locker rooms	10.000	3.100	3.500			108.500
	sunshade	1.000	113.600	0.900			102.240

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	5.519				5.519
	Total						**585.479**
	ceiling-first floor						
	canteen	1.000	23.200	10.000			232.000
	verandah	2.000	16.200	1.450			46.980
	rooms	10.000	3.100	3.500			108.500
	sunshade	1.000	113.600	0.900			102.240
	rounding	1.000	5.519				5.519
	Total						**495.239**
	column						
	Ground floor	3*14	1.500		3.100		195.300
	First floor	3*14	1.500		3.100		195.300
	rounding	1.000	10.000				10.000
	Total						**400.600**
	ground floor-beams						
	GF 1	14.000	10.000	1.000			140.000
	GF 2	3.000	45.000	0.600			81.000
	rounding	1.000	10.000				10.000
	Total						**231.000**
	First floor-beams						
	FF 1	14.000	10.000	1.000			140.000
	FF 2	3.000	45.000	0.600			81.000
	rounding	1.000	10.000				10.000
	Total						**231.000**
	outer wall						
	ground floor	1.000	110.000		0.600		66.000
	first floo	1.000	110.000		3.100		341.000
	rounding	1.000					1.000
	Total						**408.000**
	parappet						
	first floor	2.000	111.000		0.750		166.500
	first floor	1.000	2.300				2.300
	Total						**168.800**
						Total Quantity in sqm	**3808.418**
1.035	13.44.1						
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	painting						
	locker and shop rooms	10.000	13.200		3.100	1.000000	409.200
	verandah	2*2	15.000		0.600	1.000000	36.000
	net mending shed - above lintel level	1.000	56.000		0.600	1.000000	33.600
	strair room	2.000	18.700		9.000	1.000000	336.600
	canteen	1.000	66.000		3.100	1.000000	204.600
	rooms	10.000	13.200		3.100	1.000000	409.200
	Passage	1.000	13.500		3.000	1.000000	40.500
	rounding	1.000				1.000000	1.000
	D 90x210	-14.000	0.900		2.100	1.000000	-26.460
	R S	-10.000	3.100		2.400	1.000000	-74.400
		-2.000	4.800		2.400	1.000000	-23.040
	window	-26.000	1.500		1.500	1.000000	-58.500
	(Ceiling GF) net mending shed	1.000	23.200	10.000		1.000000	232.000
	stair room	2.000	9.400	4.800		1.000000	90.240
	verandah- GF	2.000	16.200	1.450		1.000000	46.980
	shop rooms and locker rooms	10.000	3.100	3.500		1.000000	108.500
	sunshade	1.000	113.600	0.900		1.000000	102.240
	rounding	1.000	5.519			1.000000	5.519
	(Ceiling FF)canteen	1.000	23.200	10.000		1.000000	232.000
	verandah	2.000	16.200	1.450		1.000000	46.980
	rooms	10.000	3.100	3.500		1.000000	108.500

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	sunshade	1.000	113.600	0.900		1.000000	102.240
	rounding	1.000	5.519			1.000000	5.519
	(GF beams) GF 1	14.000	10.000	1.000		1.000000	140.000
	GF 2	3.000	45.000	0.600		1.000000	81.000
	rounding	1.000	10.000			1.000000	10.000
	(FF Beams) FF 1	14.000	10.000	1.000		1.000000	140.000
	FF 2	3.000	45.000	0.600		1.000000	81.000
	rounding	1.000	10.000			1.000000	10.000
	(Outer wall) ground floor	1.000	110.000		0.600	1.000000	66.000
	first floor	1.000	110.000		3.100	1.000000	341.000
	rounding	1.000				1.000000	1.000
	(Parapet) first floor	2.000	111.000		0.750	1.000000	166.500
	first floor	1.000	2.300			1.000000	2.300
	Total						**3407.818**
	For Column						
	Ground floor	3*14	1.500		3.100	1.000000	195.300
	First floor	3*14	1.500		3.100	1.000000	195.300
	Rounding	1.000	10.000			1.000000	10.000
	Total						**400.600**
						Total Quantity in sqm	**3808.418**
1.036	13.62.1						
	Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade:Two or more coats on new work over an under coat of suitable shade with ordinary paint of approved brand and manufacture .						
	new wood work						
	Door D	14.000	0.900	2.210	2.250		62.654
	Window	26.000	1.500	1.500	1.000		58.500

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**121.154**
	iron work						
	Iron bars window W3	26.000	3.000	0.440	1.360		46.675
	collapsible steel shutters	10.000	3.100	2.400	2.000		148.800
		2.000	4.800	2.400	2.000		46.080
	rounding	1.000	7.291	1.000	1.000		7.291
	Total						**248.846**
						Total Quantity in sqm	**370.000**
1.037	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	Strip footing						
	Long wall	3*2	44.000		0.200		52.800
		3*2	44.000		0.250		66.000
	cross wall	14*2*2	3.500		0.200		39.200
		14*2*2	3.500		0.250		49.000
	rounding	3.000	1.000				3.000
	Total						**210.000**
						Total Quantity in sqm	**210.000**
1.038	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Ground floor -roof slab						
	GF	1.000	46.200	11.200			517.440
	Stair -landing	2.000	5.500	1.500			16.500
		2.000	2.500	1.500			7.500
		2.000	3.100	1.500			9.300
	Step	2*25.000	1.500	0.300			22.500
	Deduct stair room roof	-1.000	4.800	11.200			-53.760
	Total						**519.480**
	FF roof slab						
	FF	1.000	46.200	11.200			517.440
	Stair -landing	2.000	5.500	1.500			16.500

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		2.000	2.500	1.500			7.500
		2.000	3.100	1.500			9.300
	Step	2*25.000	1.500	0.300			22.500
	rounding	1.000	7.280				7.280
	Total						**580.520**
						Total Quantity in sqm	**1100.000**
1.039	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	GF and FF lintels,sunshades, beams						
	GF lintels, sunshades-GF sunshade	1.000	112.000	0.900			100.800
	GF lintel all round	1.000	108.400	0.600			65.040
	locker and shop rooms front side	2.000	16.800	0.600			20.160
	do- cross wall	4.000	7.000	0.500			14.000
	do- long wall	4.000	16.800	0.500			33.600
	stair room	2.000	32.000	0.500			32.000
	Beams-GF 1	14.000	10.000	1.000			140.000
	GF 2	3.000	45.000	0.600			81.000
	FF lintels, sunshade-FF sunshade	1.000	112.000	0.900			100.800
	FF lintel all round	1.000	108.400	0.600			65.040
	lintel rooms front side	2.000	16.800	0.600			20.160
	do-cross wall	4.000	7.000	0.600			16.800
	do-long wall	1.000	16.800	0.600			10.080
	stair room	2.000	32.000	0.600			38.400
	Beams-FF 1	14.000	10.000	1.000			140.000
	FF 2	3.000	45.000	0.600			81.000
	Total						**958.880**
	Plinth beam						
	long wall	3*2	44.000		0.450		118.800
	cross wall	14*2*2	5.000		0.300		84.000
	rounding	1.000	0.320				0.320

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**203.120**
						Total Quantity in sqm	**1162.000**
1.040	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	column						
	GF	3*14	1.500		3.100		195.300
	FF	3*14	1.300		3.100		169.260
	rounding	1.000	0.440		1.000		0.440
	Total						**365.000**
						Total Quantity in sqm	**365.000**
1.041	5.9.16.1						
	Centering and shuttering including strutting, etc. and removal of form for: Edges of slabs and breaks in floors and wallsUnder 20 cm wide						
	Roof edge						
	edge of slab	2.000	111.600				223.200
	rounding	1.000	1.800				1.800
	Total						**225.000**
						Total Quantity in metre	**225.000**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Compound wall and side Protection works-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Truck bay**			
1.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	920.000cum	@210.02/cum	193218.40
1.002	OD1738/2022-2023			
	Coconut Pile - Supplying and stacking well matured straight coconut post for driving down through various strata bellow bed level including cost conveyance labor charges etc complete.			
	Net Total	10570.000metre	@136.76/metre	1445553.20
1.003	OD206/2022-2023			
	OD 6380 / 2020-2021 : Coconut Pile - Driving down coconut pile to lines and levels through soft to medium clay soil strata including all hire charges and labour and all other appliances necessary for pile driving down after pointing the bottom end. Details for one post of 6m long 15 numbers per day 6X15 = 90m Details for 90m length			
	Net Total	9060.000metre	@213.34/metre	1932860.40
1.004	60.64.6			
	Cutting and removing the excess length of wooden piles to lines and levels and removing the cut end of piles and stacking within 150m			
	Net Total	3020.000each	@191.17/each	577333.40
1.005	60.7.6			
	Supplying and stacking granite stone 20 to 45 dm3 for dumping works- Supplying at site of work granite stone 20 to 45 dm3 in size (60% 45m3,30%30 to 40dm3 and 10% 20 to 30dm3 stones) for measurement (deducting not less than 15% for voids as fixed by the departmental officer at site) including all cost, conveyance, loading and unloading charges all other incidental charges all leads and lifts etc. complete as per the direction of the departmental officers at site.			
	Net Total	3040.000cum	@1994.90/cum	6064496.00
1.006	60.7.7			
	Conveyance and dumping of departmental granite stones-Conveyance of departmental granite stone 20 to 45 dm3 in size from stack at site and dumping in			

Sl No	Specification	Quantity	Rate	Amount
	position (60% 45m3,30%30 to 40dm3 and 10% 20 to 30dm3 stones) to lines and levels to from the core of the sea wall as per approved design including all leads and lifts etc. complete as per the direction of the departmental officers at site.			
	Net Total	3040.000cum	@605.23/cum	1839899.20
1.007	4.1.5			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	81.600cum	@7229.54/cum	589930.46
1.008	16.96			
	Providing & making Gabion structure with Mechanically Woven Double Twisted Hexagonal Shaped Wire mesh Gabion Boxes as per IS 16014:2012,MORTH Clause 2500, of required size, Mesh Type 10x12(D=100 mm with tolerance of ±2%), Zinic+10%Al alloy+PVC coated, Mesh wire diameter 2.7/3.7mm (ID/OD),mechanically edged/selvedged with partitions at every 1m interval and shall have minimum 10 numbersof openings per meter of mesh perpendicular to twist, tying with lacing wire of diameter2.2/3.2mm(ID/OD), supplied @3% by weight of Gabion boxes, filled with boulders with least dimension of 200 mm, as per drawing, all complete as per directions of Engineer-in-charge			
	Net Total	5130.000cum	@4735.18/cum	24291473.40
1.009	OD287/2022-2023			
	Laying of geotextile filter between pitching and embankment slopes on which pitching is laid to prevent escape of the embankment material through the voids of the stone pitching / cement concrete block as well as to allow free movements of water with out creating any uplift head on the pitching (OD approved by SE NC Order no D4 /179/2016/SE dt 23.2.2017 item no E4)and in price ID no 2017/928 			
	Net Total	4530.000sqm	@113.81/sqm	515559.30
1.010	4.1.6			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)			
	Net Total	81.600cum	@7076.05/cum	577405.68
1.011	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	305.072cum	@10858.36/cum	3312581.60
1.012	5.34.1			

Sl No	Specification	Quantity	Rate	Amount
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	305.072cum	@80.55/cum	24573.55
1.013	4.3.1			
	Centering and shuttering including strutting, propping etc. and removal of form work for:Foundations, footings, bases for columns			
	Net Total	834.270sqm	@329.03/sqm	274499.86
1.014	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	592.651cum	@7069.78/cum	4189912.19
1.015	OD288/2022-2023			
	Laterate masonry with neatly dressed laterate stone of size 30x20x20cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc. 			
	Net Total	321.235cum	@7872.96/cum	2529070.31
1.016	OD5538/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - HCR			
	Net Total	17332.880kilogram	@96.62/kilogram	1674702.87
1.017	13.1.2			
	12 mm cement plaster of mix:1:6 (1 cement : 6 fine sand).			
	Net Total	4093.500sqm	@293.67/sqm	1202138.15
1.018	13.43.1			
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer			
	Net Total	4093.500sqm	@69.33/sqm	283802.36
1.019	13.44.1			
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)			
	Net Total	4093.500sqm	@105.36/sqm	431291.16
	Heading Total(Rs)			51950301.49
	Total Estimation PAC			51950301.49
3	**Extra Charges**			

Sl No	Specification	Quantity	Rate	Amount
2.001	Provision for GST			
		51950301.49	18.00%	9351054.27
			Grand Total	61301355.76
			Round off	98644.24
			Rounded Total(Rs)	61400000.00
	Rupees Six Crore Fourteen Lakh			

ePRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Compound wall and side Protection works-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Truck bay						
1.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	Excavation						
	for compound wall near main break water to entrance gate	1.000	67.000	0.800	0.800		42.880
	from entrance gate to lee ward break water	1.000	440.000	0.800	0.800		281.600
	for side protection , East side of river training	1.000	485.000	2.400	0.300		349.200
	for side protection , west of river training	1.000	205.000	2.400	0.300		147.600
	for side protection , west of river training	1.000	120.000	2.400	0.300		86.400
	Rounding qty	1.000	12.320	1.000	1.000		12.320
	Total						**920.000**
						Total Quantity in cum	**920.000**
1.002	OD1738/2022-2023						
	Coconut Pile - Supplying and stacking well matured straight coconut post for driving down through various strata bellow bed level including cost conveyance labor charges etc complete.						
	For Gabion box at 1m interval						
	Side protection wall near east side of river training	2*485	3.500			1.000000	3395.000
	_do_ (west)	2*205	3.500			1.000000	1435.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	_do_ (west)	2*120	3.500			1.000000	840.000
	Basin boundary between main and leeward break water	2*600	3.500			1.000000	4200.000
	Basin boundary near leeward break water	2*100	3.500			1.000000	700.000
	Total						**10570.000**
						Total Quantity in metre	**10570.000**
1.003	OD206/2022-2023						
	OD 6380 / 2020-2021 : Coconut Pile - Driving down coconut pile to lines and levels through soft to medium clay soil strata including all hire charges and labour and all other appliances necessary for pile driving down after pointing the bottom end. Details for one post of 6m long 15 numbers per day 6X15 = 90m Details for 90m length						
	coconut pile						
	Side protection wall near east side of river training	2*485	3.000			1.000000	2910.000
	_do_ (west)	2*205	3.000			1.000000	1230.000
	_do_ (west)	2*120	3.000			1.000000	720.000
	Basin boundary between main and leeward break water	2*600	3.000			1.000000	3600.000
	Basin boundary near leeward break water	2*100	3.000			1.000000	600.000
	Total						**9060.000**
						Total Quantity in metre	**9060.000**
1.004	60.64.6						
	Cutting and removing the excess length of wooden piles to lines and levels and removing the cut end of piles and stacking within 150m						
	excess length cutting						
	Side protection wall near east side of river training	2*485				1.000000	970.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	_do_ (west)	2*205				1.000000	410.000
	_do_ (west)	2*120				1.000000	240.000
	Basin boundary between main and leeward break water	2*600				1.000000	1200.000
	Basin boundary near leeward break water	2*100				1.000000	200.000
	Total						**3020.000**
						Total Quantity in each	**3020.000**
1.005	60.7.6						
	Supplying and stacking granite stone 20 to 45 dm3 for dumping works- Supplying at site of work granite stone 20 to 45 dm3 in size (60% 45m3,30%30 to 40dm3 and 10% 20 to 30dm3 stones) for measurement (deducting not less than 15% for voids as fixed by the departmental officer at site) including all cost, conveyance, loading and unloading charges all other incidental charges all leads and lifts etc. complete as per the direction of the departmental officers at site.						
	side protection wall						
	for side protection , East side of river training	1.000	485.000	2.400	0.450		523.800
	for side protection , west of river training	1.000	205.000	2.400	0.450		221.400
	for side protection , west of river training	1.000	120.000	2.400	0.450		129.600
	Basin boundary between main and leeward break water	1.000	600.000	2.400	1.000	1.000000	1440.000
	Basin boundary near leeward break water	1.000	300.000	2.400	1.000	1.000000	720.000
	roundig	5.200					5.200
	Total						**3040.000**
						Total Quantity in cum	**3040.000**
1.006	60.7.7						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Conveyance and dumping of departmental granite stones-Conveyance of departmental granite stone 20 to 45 dm3 in size from stack at site and dumping in position (60% 45m3,30%30 to 40dm3 and 10% 20 to 30dm3 stones) to lines and levels to from the core of the sea wall as per approved design including all leads and lifts etc. complete as per the direction of the departmental officers at site.						
	for side protection wall						
	for side protection , East side of river training	1.000	485.000	2.400	0.450		523.800
	for side protection , west of river training	1.000	205.000	2.400	0.450		221.400
	for side protection , west of river training	1.000	120.000	2.400	0.450		129.600
	Basin boundary between main and leeward break water	1.000	600.000	2.400	1.000	1.000000	1440.000
	Basin boundary near leeward break water	1.000	300.000	2.400	1.000	1.000000	720.000
	rounding	1.000	5.200			1.000000	5.200
	Total						**3040.000**
						Total Quantity in cum	**3040.000**
1.007	4.1.5						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	foundation footing						
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.800	0.200		11.200
	from entrance gate to lee ward breakwater	1.000	440.000	0.800	0.200		70.400
	Total						**81.600**
						Total Quantity in cum	**81.600**
1.008	16.96						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing & making Gabion structure with Mechanically Woven Double Twisted Hexagonal Shaped Wire mesh Gabion Boxes as per IS 16014:2012,MORTH Clause 2500, of required size, Mesh Type 10x12(D=100 mm with tolerance of ±2%), Zinic+10%Al alloy+PVC coated, Mesh wire diameter 2.7/3.7mm (ID/OD),mechanically edged/selvedged with partitions at every 1m interval and shall have minimum 10 numbersof openings per meter of mesh perpendicular to twist, tying with lacing wire of diameter2.2/3.2mm(ID/OD), supplied @3% by weight of Gabion boxes, filled with boulders with least dimension of 200 mm, as per drawing, all complete as per directions of Engineer-in-charge						
	gabion box						
	Side protection wall near east side of river training	1.000	485.000	2.000	1.000	1.000000	970.000
		1.000	485.000	1.000	1.000	1.000000	485.000
	_do_ (west)	1.000	205.000	2.000	1.000	1.000000	410.000
		1.000	205.000	1.000	1.000	1.000000	205.000
	_do_ (west)	1.000	120.000	2.000	1.000	1.000000	240.000
		1.000	120.000	1.000	1.000	1.000000	120.000
	Basin boundary between main and leeward break water	1.000	600.000	2.000	1.000	1.000000	1200.000
		1.000	600.000	1.000	1.000	1.000000	600.000
	Basin boundary near leeward break water	1.000	300.000	2.000	1.000	1.000000	600.000
		1.000	300.000	1.000	1.000	1.000000	300.000
	Total						**5130.000**
						Total Quantity in cum	**5130.000**
1.009	OD287/2022-2023						
	Laying of geotextile filter between pitching and embankment slopes on which pitching is laid to prevent escape of the embankment material through the voids of the stone pitching / cement concrete block as well as to allow free movements of water with out creating any uplift head on the pitching (OD approved by SE NC Order no D4 /179/2016/SE dt 23.2.2017 item no E4)and in price ID no 2017/928 						
	geotextile						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Side protection wall near east side of river training	1.000	485.000		3.000	1.000000	1455.000
	_do_ (west)	1.000	205.000		3.000	1.000000	615.000
	_do_ (west)	1.000	120.000		3.000	1.000000	360.000
	Basin boundary between main and leeward break water	1.000	600.000		3.000	1.000000	1800.000
	Basin boundary near leeward break water	1.000	100.000		3.000	1.000000	300.000
	Total						**4530.000**
						Total Quantity in sqm	**4530.000**
1.010	4.1.6						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)						
	cement concrete						
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.800	0.200		11.200
	from entrance gate to lee ward breakwater	1.000	440.000	0.800	0.200		70.400
	Total						**81.600**
						Total Quantity in cum	**81.600**
1.011	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	coping						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.350	0.075		1.838
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.350	0.075/2		0.919
	from entrance gate to lee ward breakwater	1.000	440.000	0.350	0.075		11.550
	from entrance gate to lee ward breakwater	1.000	440.000	0.350	0.075/2		5.775
	sideprotectioneast of river training work	1.000	485.000	0.350	0.075	1.000000	12.731
	sideprotectioneast of river training work	1.000	485.000	0.350	0.075/2	1.000000	6.366
	Butress wall at 3.6 m intervals	276.000	0.550	0.550	0.075	1.000000	6.262
	Butress wall at 3.6 m intervals	276.000	0.550	0.550	0.075/2	1.000000	3.131
	Total						**48.572**
	belt over gabion box						
	sideprotectioneast of river training work	1.000	485.000	1.000	0.150	1.000000	72.750
	do west	1.000	205.000	1.000	0.150	1.000000	30.750
	do	1.000	120.000	1.000	0.150	1.000000	18.000
	basin boundary between main and leeward	1.000	600.000	1.000	0.150	1.000000	90.000
	near leeward breakwater	1.000	300.000	1.000	0.150	1.000000	45.000
	Total						**256.500**
						Total Quantity in cum	**305.072**
1.012	5.34.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	coping						
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.350	0.075		1.838
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.350	0.075/2		0.919
	from entrance gate to lee ward breakwater	1.000	440.000	0.350	0.075		11.550
	from entrance gate to lee ward breakwater	1.000	440.000	0.350	0.075/2		5.775
	sideprotectioneast of river training work	1.000	485.000	0.350	0.075	1.000000	12.731
	sideprotectioneast of river training work	1.000	485.000	0.350	0.075/2	1.000000	6.366
	Butress wall at 3.6 m intervals	276.000	0.550	0.550	0.075	1.000000	6.262
	Butress wall at 3.6 m intervals	276.000	0.550	0.550	0.075/2	1.000000	3.131
	Total						**48.572**
	belt over gabion box						
	sideprotectioneast of river training work	1.000	485.000	1.000	0.150	1.000000	72.750
	do west	1.000	205.000	1.000	0.150	1.000000	30.750
	do	1.000	120.000	1.000	0.150	1.000000	18.000
	basin boundary between main and leeward	1.000	600.000	1.000	0.150	1.000000	90.000
	near leeward breakwater	1.000	300.000	1.000	0.150	1.000000	45.000
	Total						**256.500**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**305.072**
1.013	4.3.1						
	Centering and shuttering including strutting, propping etc. and removal of form work for:Foundations, footings, bases for columns						
	shuttering work						
	sideprotectioneast of river training work	2.000	485.000		0.150	1.000000	145.500
	do west	2.000	205.000		0.150	1.000000	61.500
	do	2.000	120.000		0.150	1.000000	36.000
	basin boundary between main and leeward	2.000	600.000		0.150	1.000000	180.000
	near leeward breakwater	2.000	300.000		0.150	1.000000	90.000
	Total						**513.000**
	for coping						
	for compound wall over land ,from auction hall area to entrance gate	2.000	70.000		0.150		21.000
	from entrance gate to lee ward breakwater	2.000	440.000		0.150		132.000
	sideprotectioneast of river training work	2.000	485.000		0.150	1.000000	145.500
	Butress wall at 3.6 m intervals	276.000	0.550		0.150	1.000000	22.770
	Total						**321.270**
						Total Quantity in sqm	**834.270**
1.014	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	RR						
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.600	0.600		25.200

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.450	0.450		14.175
	from entrance gate to lee ward breakwater	1.000	440.000	0.600	0.600		158.400
	for compound wall over land ,from auction hall area to entrance gate	1.000	440.000	0.450	0.450		89.100
	side protection east of river training work	1.000	485.000	0.450	0.450	1.000000	98.213
	do west	1.000	205.000	0.450	0.450	1.000000	41.513
	do	1.000	120.000	0.450	0.450	1.000000	24.300
	basin boundary between main and leeward	1.000	600.000	0.450	0.450	1.000000	121.500
	near leeward breakwater	1.000	100.000	0.450	0.450	1.000000	20.250
	Total						**592.651**
						Total Quantity in cum	**592.651**
1.015	OD288/2022-2023						
	Laterate masonry with neatly dressed laterate stone of size 30x20x20cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc. 						
	laterite masonry						
		1.000					1.000
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.200	1.500		21.000
	from entrance gate to lee ward breakwater	1.000	440.000	0.200	1.500		132.000
	sideprotectioneast of river training work	1.000	485.000	0.200	1.500	1.000000	145.500
	Butress wall at 3.6 m intervals	276.000	0.350	0.150	1.500	1.000000	21.735

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**321.235**
						Total Quantity in cum	**321.235**
1.016	OD5538/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - HCR						
	Steel						
	LS Wt taken as 40kg/m3 for item no 11	1.000	48.572			40.000000	1942.880
	LS Wt taken as 60kg/m3 for item no 11 belt	1.000	256.500			60.000000	15390.000
	Total						**17332.880**
						Total Quantity in kilogram	**17332.880**
1.017	13.1.2						
	12 mm cement plaster of mix:1:6 (1 cement : 6 fine sand).						
	plastering						
	for compound wall over land ,from auction hall area to entrance gate	2.000	70.000		1.500		210.000
	from entrance gate to lee ward breakwater	2.000	440.000		1.500		1320.000
	sideprotectioneast of river training work	2.000	485.000		1.500	1.000000	1455.000
	Butress wall at 3.6 m intervals	276.000	0.500		1.500	1.000000	207.000
	Total						**3192.000**
	plastering over coping						
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.750			52.500
	from entrance gate to lee ward breakwater	1.000	440.000	0.750			330.000
	sideprotectioneast of river training work	1.000	485.000	0.750		1.000000	363.750

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Butress wall at 3.6 m intervals	276.000	0.750	0.750		1.000000	155.250
	Total						**901.500**
						Total Quantity in sqm	**4093.500**
1.018	13.43.1						
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	primer						
	for compound wall over land ,from auction hall area to entrance gate	2.000	70.000		1.500		210.000
	from entrance gate to lee ward breakwater	2.000	440.000		1.500		1320.000
	sideprotectioneast of river training work	2.000	485.000		1.500	1.000000	1455.000
	Butress wall at 3.6 m intervals	276.000	0.500		1.500	1.000000	207.000
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.750			52.500
	from entrance gate to lee ward breakwater	1.000	440.000	0.750			330.000
	sideprotectioneast of river training work	1.000	485.000	0.750		1.000000	363.750
	Butress wall at 3.6 m intervals	276.000	0.750	0.750		1.000000	155.250
	Total						**4093.500**
						Total Quantity in sqm	**4093.500**
1.019	13.44.1						
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)						
	painting						
	for compound wall over land ,from auction hall area to entrance gate	2.000	70.000		1.500		210.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	from entrance gate to lee ward breakwater	2.000	440.000		1.500		1320.000
	sideprotectioneast of river training work	2.000	485.000		1.500	1.000000	1455.000
	Butress wall at 3.6 m intervals	276.000	0.500		1.500	1.000000	207.000
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.750			52.500
	from entrance gate to lee ward breakwater	1.000	440.000	0.750			330.000
	sideprotectioneast of river training work	1.000	485.000	0.750		1.000000	363.750
	Butress wall at 3.6 m intervals	276.000	0.750	0.750		1.000000	155.250
	Total						**4093.500**
						Total Quantity in sqm	**4093.500**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasargod District- Construction of Gate and Gate House-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Gate and Gate house**			
1.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	50.000cum	@210.02/cum	10501.00
1.002	2.26.1			
	Extra for every additional lift 1.5 m or part there of in excavation / banking excavated or stacked materials.All kinds of soil			
	Net Total	2.250cum	@104.39/cum	234.88
1.003	2.16.1			
	Close timbering in trenches including strutting, shoring and packing cavities (wherever required) complete (Measurements to be taken of the face area timbered).Depth not exceeding 1.5m			
	Net Total	18.000sqm	@150.11/sqm	2701.98
1.004	OD1742/2022-2023			
	Bailing out water Using 5HP Pump- Bailing out water with 5HP engine and pump set including conveyance to site and erection, cost of fuel, lubrication oil and other stores, pay of staff etc complete			
	Net Total	50.000hour	@372.81/hour	18640.50
1.005	60.7.2			
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.			
	Net Total	10.000cum	@2557.65/cum	25576.50
1.006	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	20.000cum	@6687.21/cum	133744.20
1.007	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	15.000cum	@7069.78/cum	106046.70
1.008	OD308/2022-2023			
	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. All work upto plinth level 			
	Net Total	3.676cum	@9317.74/cum	34252.01
1.009	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	11.040sqm	@329.03/sqm	3632.49
1.010	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	35.040sqm	@847.44/sqm	29694.30
1.011	OD309/2022-2023			
	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. All work above plinth level upto floor V level 			
	Net Total	12.071cum	@10938.91/cum	132043.58
1.012	5.22.6			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - Mechanically Treated bars of grade Fe-500D or more			
	Net Total	313.520kilogram	@96.46/kilogram	30242.14
1.013	5.22A.6			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - Mechanically Treated bars of grade Fe-500D or more			
	Net Total	1509.740kg	@96.46/kg	145629.52
1.014	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	51.388sqm	@637.63/sqm	32766.53
1.015	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	36.476sqm	@800.47/sqm	29197.94
1.016	5.9.16.1			
	Centering and shuttering including strutting, etc. and removal of form for: Edges of slabs and breaks in floors and wallsUnder 20 cm wide			
	Net Total	63.600metre	@200.11/metre	12727.00
1.017	50.6.1.5			
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x20cm or nearest available size confirming to IS 2185 Part I of 1979 for super structure up to floor two level thickness 20cm and above in: CM 1:6 (1 cement : 6 coarse sand) etc complete			
	Net Total	10.488cum	@6580.80/cum	69019.43
1.018	9.48.2			
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc			
	Net Total	86.725kg	@211.94/kg	18380.50
1.019	9.117.2			
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 42x50 mm			
	Net Total	10.400metre	@308.89/metre	3212.46
1.020	9.118.1			
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	4.200sqm	@2033.68/sqm	8541.46
1.021	5.23			
	Smooth finishing of the exposed surface of RCC work with 6mm thick cement mortar 1:3 (cement : 3 fine sand).			
	Net Total	136.364sqm	@262.57/sqm	35805.10
1.022	13.1.1			
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	66.000sqm	@308.22/sqm	20342.52
1.023	11.41.2			
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.			
	Net Total	15.440sqm	@1733.20/sqm	26760.61
1.024	13.48.1			
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm			
	Net Total	85.676sqm	@164.22/sqm	14069.71
1.025	13.47.1			
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)			
	Net Total	137.736sqm	@186.15/sqm	25639.56
1.026	13.52.1			
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work			
	Net Total	30.880sqm	@219.17/sqm	6767.97
1.027	9.97.2			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:250x10 mm			
	Net Total	2.000no	@119.63/no	239.26
1.028	9.100.2			
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm			
	Net Total	2.000no	@61.02/no	122.04

Sl No	Specification	Quantity	Rate	Amount
1.029	12.47.1			
	Providing & fixing UV stabilised fibre glass reinforced plastic sheet rooting up to any pitch, including fixing with polymer coated 'J' or 'L' hooks, bolts & nuts 8 mm dia G.I plain/ bitumen washers complete but excluding the cost of purlins, rafters, trusses etc. The sheets shall be manufactured out of 2400 TEX panel rovings incorporating minimum 0.3% ultra-violet stabiliser in resin system under approxirnately 2400 psi and hot cured. They shall be of uniform pigmentation and thickness without air pockets and shall conform to IS 10192 and IS 12866. The sheets shall be opaque or translucent, clear or pigmented, textured or smooth as specified.2 mm thick corrugate 2.5"or 4.2" or 6") or step-down (2' or 3" or 6") as specified.			
	Net Total	15.428sqm	@1265.03/sqm	19516.88
1.030	10.25.2			
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works			
	Net Total	128.339kg	@151.29/kg	19416.41
1.031	21.1.1.3			
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionPolyester powder coated aluminium (minimum thickness of polyester powder coating 50 micron)			
	Net Total	69.972kg	@536.75/kg	37557.47
1.032	21.1.2.3			
	For shutters of doors, windows & ventilators including providing and fixing hinges / pivots and making provision for fixing of fittings wherever required including the cost of EPDM rubber/ neoprene gasket required (Fittings shall be paid for separately)Polyester powder coated aluminium (minimum thickness of polyester powder coating 50 micorn)			
	Net Total	83.116kg	@641.01/kg	53278.19
1.033	21.3.1			
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 4.0 mm thickness			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	7.110sqm	@1154.59/sqm	8209.13
1.034	8.2.2.2			
	Providing and fixing 18 mm thick gang saw cut, mirror, polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations, of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.Area of slab over 0.50 sqm			
	Net Total	71.625sqm	@4629.02/sqm	331553.56
			Heading Total(Rs)	1446063.53
			Total Estimation PAC	1446063.53
3	**Extra Charges**			
2.001	Provision for GST			
		1446063.53	18.00%	260291.44
			Grand Total	1706354.97
			Round off	93645.03
			Rounded Total(Rs)	1800000.00
	Rupees Eighteen Lakh			

e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasargod District- Construction of Gate and Gate House-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Gate and Gate house						
1.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	gate & gate house						
	For main pillars	2.000	1.500	1.500	2.000		9.000
	For side pillars	2.000	1.200	1.200	1.500		4.320
	For walls	2.000	10.400	0.900	1.100		20.592
	Steps	2.000	2.800	0.450	0.300		0.756
	Wicket gate	2.000	3.140	(.9*.9)/4	0.300		0.382
	Building floor (All round)	2.000	17.200	1.500	0.150		7.740
	Gate portion	1.000	4.000	5.800	0.150		3.480
	rounding	1.000	3.730				3.730
	Total						**50.000**
						Total Quantity in cum	**50.000**
1.002	2.26.1						
	Extra for every additional lift 1.5 m or part there of in excavation / banking excavated or stacked materials.All kinds of soil						
	gate house						
	For main pillars	2.000	1.500	1.500	0.500		2.250
	Total						**2.250**
						Total Quantity in cum	**2.250**
1.003	2.16.1						
	Close timbering in trenches including strutting, shoring and packing cavities (wherever required) complete (Measurements to be taken of the face area timbered).Depth not exceeding 1.5m						
	gate house						
	For main pillars	2.000	6.000		1.500		18.000
	Total						**18.000**
						Total Quantity in sqm	**18.000**
1.004	OD1742/2022-2023						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Bailing out water Using 5HP Pump- Bailing out water with 5HP engine and pump set including conveyance to site and erection, cost of fuel, lubrication oil and other stores, pay of staff etc complete						
	For Gate and Gate House						
	Pumping required for 10 hrs with 5 hp pump set	5.000	10.000			1.000000	50.000
	Total						**50.000**
						Total Quantity in hour	**50.000**
1.005	60.7.2						
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.						
	Gate and gate house						
	For main pillars	2.000	1.500	1.500	0.300		1.350
	For side pillars	2.000	1.200	1.200	0.300		0.864
	For walls	2.000	10.400	0.900	0.300		5.616
	Steps	2.000	2.800	0.450	0.200		0.504
	rounding	1.000	1.666				1.666
	Total						**10.000**
						Total Quantity in cum	**10.000**
1.006	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	pcc						
	For main pillars	2.000	1.500	1.500	0.150		0.675
	For side pillars	2.000	1.200	1.200	0.150		0.432
	For walls	2.000	10.400	0.900	0.150		2.808
	Steps	2.000	2.800	0.450	0.100		0.252
	room inside	2.000	2.400	2.400	0.120		1.382
	Wicket gate	2.000	3.140	(.9*.9)/4	0.300		0.382
	Building floor (All round)	2.000	17.200	1.500	0.150		7.740
	Gate portion	1.000	4.000	5.800	0.150		3.480
	rounding	1.000	2.849				2.849
	Total						**20.000**
						Total Quantity in cum	**20.000**
1.007	7.1.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	gate house						
	For walls-Foundation	2.000	10.400	0.600	0.600		7.488
	For walls-Basement	2.000	10.400	0.450	0.450		4.212
	Steps	2.000	2.800	0.450	0.200		0.504
	rounding	1.000	2.796				2.796
	Total						**15.000**
						Total Quantity in cum	**15.000**
1.008	OD308/2022-2023						
	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. All work upto plinth level 						
	Column Footing of Gate House						
	For main pillars	2.000	1.500	1.500	0.200		0.900
	For side pillars	2.000	1.200	1.200	0.200		0.576
	For main pillars - f r u s t u m 0 . 4 / 3 (A 1 + A 2) + s q . r o o t of(A1xA2) = A1 = 1.5x1.5 = 2.25, A2 = 1x0.40 = 0.40 = sq.root (A1xA2) = sq.root(2.25 x 0.40) = 0 . 9 5 2x0.4/3x(2.25+0. 4+0.9 5)=0.96	2.000	0.133	3.600			0.958
	For main pillars	2.000	0.900	0.300	0.950		0.513
	For side pillars	2.000	0.900	0.300	0.450		0.243
	Total						**3.190**
	Columns upto plinth level						
	For main pillars	2.000	0.900	0.300	0.450		0.243
	For side pillars	2.000	0.900	0.300	0.450		0.243

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**0.486**
						Total Quantity in cum	**3.676**
1.009	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	gate house column footing						
	For main pillars	2.000	(0.9+0.3) *2		0.950		4.560
	For side pillars	2.000	(0.9+0.3) *2		0.450		2.160
	Total						**6.720**
	Gate (Columns upto plinth level)						
	For main pillars	2.000	(.9+.3)*2		0.450		2.160
	For side pillars	2.000	(.9+.3)*2		0.450		2.160
	Total						**4.320**
						Total Quantity in sqm	**11.040**
1.010	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	For column above plinth level						
	Upto roof slab	2.000	2.400		4.250		20.400
	Top portion of Pillar	2.000	4.000		0.300		2.400
	For side pillars	2.000	2.400		2.550		12.240
	Total						**35.040**
						Total Quantity in sqm	**35.040**
1.011	OD309/2022-2023						
	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. All work above plinth level upto floor V level 						
	lintel						
	lintel over wall	2.000	10.400	0.200	0.150		0.624
	Total						**0.624**
	Roof slab						
	Sloped roof	2*2	3.700	2.180	0.100		3.226
	Parallel portion	2*2	0.900	1.170	0.100		0.421

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**3.647**
	Purgola						
	Purgola	4.000	7.400	0.200	0.600		3.552
	Purgola	5*3	0.200	0.300	0.300		0.270
	Total						**3.822**
	For column above plinth level						
	Upto roof slab	2.000	0.900	0.300	4.250		2.295
	Top portion of Pillar	2.000	1.700	0.300	0.300		0.306
	For side pillars	2.000	0.900	0.300	2.550		1.377
	Total						**3.978**
						Total Quantity in cum	**12.071**
1.012	5.22.6						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - Mechanically Treated bars of grade Fe-500D or more						
	steel						
	Column footing of gate house @ 80kg per m3	1.000	3.190			80.000000	255.200
	For column up to plinth level @ 120kg/m3 for item No.8	1.000	0.486			120.000000	58.320
	Total						**313.520**
						Total Quantity in kilogram	**313.520**
1.013	5.22A.6						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - Mechanically Treated bars of grade Fe-500D or more						
	Steel						
	For column above plinth level @ 160kg/m3	1.000	3.978			160.000000	636.480
	Lintel over wall @ 80kg/m3	1.000	0.624			80.000000	49.920
	Roof slab @100kg/m3	1.000	3.647			100.000000	364.700
	Purgolas @ 120kg/m3	1.000	3.822			120.000000	458.640
	Total						**1509.740**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in kg	**1509.740**
1.014	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	lintel						
	lintel over wall	2.000	10.280			0.300000	6.168
	Total						**6.168**
	Purgola						
	Purgola	4.000	7.400	1.400			41.440
		7*3	0.200	0.900			3.780
	Total						**45.220**
						Total Quantity in sqm	**51.388**
1.015	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Roof slab						
	Sloped roof	2*2	3.700	2.180			32.264
	Parallel portion	2*2	0.900	1.170			4.212
	Total						**36.476**
						Total Quantity in sqm	**36.476**
1.016	5.9.16.1						
	Centering and shuttering including strutting, etc. and removal of form for: Edges of slabs and breaks in floors and wallsUnder 20 cm wide						
	Roof slab edge						
	Sloped roof	2*2	(3.700+2.18)*2				47.040
	Parallel portion	2*2	(.9+1.17)*2				16.560
	Total						**63.600**
						Total Quantity in metre	**63.600**
1.017	50.6.1.5						
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x20cm or nearest available size confirming to IS 2185 Part I of 1979 for super structure up to floor two level thickness 20cm and above in: CM 1:6 (1 cement : 6 coarse sand) etc complete						
	gate house						
	Super structure	2.000	10.400	0.200	3.000		12.480
	Total						**12.480**
	deductions						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Doors	-2.000	1.000	0.200	2.100		-0.840
	windows	-3.000	1.000	0.200	1.400		-0.840
	Lintel	-1.000	10.400	0.200	0.150		-0.312
	Total						**-1.992**
						Total Quantity in cum	**10.488**
1.018	9.48.2						
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc						
	Details for 1.08 sqm						
	Window W,MS bar 16mm dia,1.58kg/m	2.000	1.000	1.400		15.231000	42.647
	Front gate,M.S. flat 2 5 x 3 . 1 5 m m , @ 0 . 6 3 k g / m	1.000	7.000	1.700		3.704000	44.078
	Total						**86.725**
						Total Quantity in kg	**86.725**
1.019	9.117.2						
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 42x50 mm						
	door						
	D	2.000	5.200				10.400
	Total						**10.400**
						Total Quantity in metre	**10.400**
1.020	9.118.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).						
	Door						
	D	2.000	1.000		2.100		4.200
	Total						**4.200**
						Total Quantity in sqm	**4.200**
1.021	5.23						
	Smooth finishing of the exposed surface of RCC work with 6mm thick cement mortar 1:3 (cement : 3 fine sand).						
	Purgola						
	Purgola	4.000	7.000	1.600			44.800
	Purgola	5*3	0.200	1.200			3.600
	Total						**48.400**
	pillars						
	For side pillars	2.000	2.400	2.550			12.240
	For main pillar Top	2.000	1.700	0.300			1.020
	-d0- head	2.000	4.000	0.300			2.400
	For main pillars	2.000	2.400	4.250			20.400
	Total						**36.060**
	ceiling						
	ceiling	1.000	7.600	2.030			15.428
		2*2	3.700	2.180			32.264
		2*2	0.900	1.170			4.212
	Total						**51.904**
						Total Quantity in sqm	**136.364**
1.022	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	plastering						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	inside wall	2.000	9.600		3.000		57.600
	Outer wall (remaining granite portion)	2.000	2.800		3.000		16.800
	Total						**74.400**
	deductions						
	door	-2.000	1.000		2.100		-4.200
	window	-3.000	1.000		1.400		-4.200
	Total						**-8.400**
						Total Quantity in sqm	**66.000**
1.023	11.41.2						
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.						
	flooring						
	room-floor	2.000	2.400	2.400			11.520
	steps	2.000	2.800	0.700			3.920
	Total						**15.440**
						Total Quantity in sqm	**15.440**
1.024	13.48.1						
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm						
	Gate house and roof (inside)						
	Inside wall	2.000	9.600	3.000			57.600
	Sloped roof (inside)	2*2	3.700	2.180			32.264
	Parallelportion(inside)	4.000	0.900	1.170			4.212
	Total						**94.076**
	deductions						
	Door	-2.000	1.000		2.100		-4.200
	window	-3.000	1.000		1.400		-4.200
	Total						**-8.400**
						Total Quantity in sqm	**85.676**
1.025	13.47.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)						
	outer side						
	Outer Wall (remaining granite portion)	2.000	2.800	3.000			16.800
	Purgolas	4.000	7.000	1.600			44.800
		5*3	0.200	1.200			3.600
	Total						**65.200**
	Pillars						
	For side pillars	2.000	2.400	2.550			12.240
	For main pillar Top	2.000	1.700	0.300			1.020
	-d0- head	2.000	4.000	0.300			2.400
	For main pillars	2.000	2.400	4.250			20.400
	Total						**36.060**
	roof						
	sloped roof(out side)	2*2	3.700	2.180			32.264
		2*2	0.900	1.170			4.212
	Total						**36.476**
						Total Quantity in sqm	**137.736**
1.026	13.52.1						
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work						
	painting						
	window	3.000	1.000	1.400			4.200
	Front gate	2.000	7.000	1.700			23.800
	Wicket gate	2*4	0.400	0.900			2.880
	Total						**30.880**
						Total Quantity in sqm	**30.880**
1.027	9.97.2						
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:250x10 mm						
	250x10mm tower bolt						
		2.000					2.000
	Total						**2.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in no	**2.000**
1.028	9.100.2						
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm						
	Al handle 100mm with plate 150mm x32mm						
		2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.029	12.47.1						
	Providing & fixing UV stabilised fibre glass reinforced plastic sheet rooting up to any pitch, including fixing with polymer coated 'J' or 'L' hooks, bolts & nuts 8 mm dia G.I plain/ bitumen washers complete but excluding the cost of purlins, rafters, trusses etc. The sheets shall be manufactured out of 2400 TEX panel rovings incorporating minimum 0.3% ultra-violet stabiliser in resin system under approxirnately 2400 psi and hot cured. They shall be of uniform pigmentation and thickness without air pockets and shall conform to IS 10192 and IS 12866. The sheets shall be opaque or translucent, clear or pigmented, textured or smooth as specified.2 mm thick corrugate 2.5"or 4.2" or 6") or step-down (2' or 3" or 6") as specified.						
	Details of cost for area of roof 2x18.09x5.1 = 184.518 sqm						
	Purgola roof	1.000	7.600	2.030			15.428
	Total						**15.428**
						Total Quantity in sqm	**15.428**
1.030	10.25.2						
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works						
	gate						
	Front gate - 33.6@ (14.5+.084)/2 kg/m	2.000	7.000		(14.5+.084)/2		102.088
	Wicket gate	4.000	0.900		(14.5+.084)/2		26.251
	Total						**128.339**
						Total Quantity in kg	**128.339**
1.031	21.1.1.3						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionPolyester powder coated aluminium (minimum thickness of polyester powder coating 50 micron)						
	Aluminium work						
	Door D-Weight @ 8.33kg/m2	2.000	1.000	2.100	8.330		34.986
	Al window	3.000	1.000	1.400	8.330		34.986
	Total						**69.972**
						Total Quantity in kg	**69.972**
1.032	21.1.2.3						
	For shutters of doors, windows & ventilators including providing and fixing hinges / pivots and making provision for fixing of fittings wherever required including the cost of EPDM rubber/ neoprene gasket required (Fittings shall be paid for separately)Polyester powder coated aluminium (minimum thickness of polyester powder coating 50 micorn)						
	shutters						
	Door D Weight @ 11.69kg/m	2.000	0.900	2.000	11.690		42.084
	Area of aluminium windows @11.69 kg/m	3.000	0.900	1.300	11.690		41.032
	Total						**83.116**
						Total Quantity in kg	**83.116**
1.033	21.3.1						
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 4.0 mm thickness						
	shutters						
	Area of aluminium door shutters	2.000	0.900	2.000			3.600
	Area of aluminium window shutters	3.000	0.900	1.300			3.510

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**7.110**
						Total Quantity in sqm	**7.110**
1.034	8.2.2.2						
	Providing and fixing 18 mm thick gang saw cut, mirror, polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations, of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.Area of slab over 0.50 sqm						
	gate house						
	Out side walls of ATM counter	3.000	2.800	3.000			25.200
	Out side walls of toll booth	3.000	2.800	3.000			25.200
	Compound wall front	2.000	10.000	1.200			24.000
	Name board	1.000	7.500	0.750			5.625
	Total						**80.025**
	deductions						
	Door	-2.000	1.000		2.100		-4.200
	window	-3.000	1.000		1.400		-4.200
	Total						**-8.400**
						Total Quantity in sqm	**71.625**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Construction of Internal Road, Parking area and Drainage facility-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Concrete road & drainage work**			
1.001	3.15.2			
	Compacting Original Ground (ii) Compacting original ground supporting subgrade Loosening of the ground upto a level of 300 mm below the subgrade level, watered, graded and compacted in layers to meet requirement of Tables 300.1 and 300.2 for subgrade construction as per Technical Specification Clause 303.5.2.			
	Net Total	3270.000cum	@62.02/cum	202805.40
1.002	3.2			
	Preparation of Foundation for Embankment Scarifying Existing Bituminous Surface to a Depth of 150 mm by Mechanical Means Scarifying the existing bituminous road surface to a depth of 150 mm and disposal of scarified material with a lift upto 3 m and lead upto 1000 m as per Technical Specification Clause 301.4.			
	Net Total	1200.000sqm	@9.63/sqm	11556.00
1.003	11.1.1.1			
	Excavation for Structures Earthwork in excavation for structures as per drawing and technical specifications Clause 305.1 including setting out, construction of shoring and bracing, removal of stumps and other deleterious material and disposal upto a lead of 50 m, dressing of sides and bottom and backfilling in trenches with excavated suitable material. I. Ordinary soil (i) Upto 3 m depth			
	Net Total	275.400cum	@750.44/cum	206671.18
1.004	3.4			
	Construction of Embankment with Material Obtained from Borrow Pits Construction of embankment with approved material obtained from borrow pits with a lift upto 1.5 m, transporting to site, spreading, grading to required slope and compacting to meet requirement of Tables 300.1 and 300.2 with a lead upto 1000 m as per Technical Specification Clause 301.5			
	Net Total	1716.800cum	@463.32/cum	795427.78
1.005	4.1.A.1			
	Granular Sub-base with Well Graded Material (Table 400.1) (A) By Mix in Place Method Construction of granular sub-base by providing well graded material, spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC, and compacting with smooth wheel roller to achieve the desired density, complete as per Technical Specification Clause 401. (i) For Grading I Material			
	Net Total	1092.000cum	@2917.23/cum	3185615.16
1.006	11.4.1.1			
	Providing concrete for plain/reinforced concrete in open foundations complete as per			

Sl No	Specification	Quantity	Rate	Amount
	drawings and technical specifications Clause 802, 803, 1202 & 1203 I. P.C.C grade M 10 (i) Nominal mix 1:3:6			
	Net Total	717.100cum	@7646.85/cum	5483556.14
1.007	11.4.3.1			
	Providing concrete for plain/reinforced concrete in open foundations complete as per drawings and technical specifications Clause 802, 803, 1202 & 1203 III. P.C.C. grade M 20 (i) Nominal mix (1:2:4)			
	Net Total	84.200cum	@8116.64/cum	683421.09
1.008	11.4.5			
	Providing concrete for plain/reinforced concrete in open foundations complete as per drawings and technical specifications Clause 802, 803, 1202 & 1203 V. R.C.C. grade M 25			
	Net Total	650.000cum	@8861.61/cum	5760046.50
1.009	11.8			
	Supplying, fitting and placingTMT bar reinforcement in foundation complete as per drawings and technical specifications Clauses 1000 and 1202			
	Net Total	19.500tonne	@86333.07/tonne	1683494.87
1.010	4.9			
	Wet Mix Macadam Providing, laying, spreading and compacting graded stone aggregate to wet mix macadam specification including premixing the material with water at OMC in mechanical mixer (Pug Mill), carriage of mixed material by tipper to site, laying in uniform layers in sub-base/base course on a well prepared sub-base and compacting with smooth wheel roller of 80 to 100kN weight to achieve the desired density including lighting, barricading and maintenance of diversion, etc as per Tables 400.11 & 400.12 and Technical Specification Clause 406. By Mechanical Means with 1 km lead			
	Net Total	444.000cum	@3255.46/cum	1445424.24
1.011	5.1.1a			
	Prime Coat :- Low porosity Providing and applying primer coat with bitumen emulsion (SS-1) on prepared surface of granular base including cleaning of road surface and spraying primer at the rate of 0.70-1.0 kg/sqm using mechanical means as per Technical Specification Clause 502			
	Net Total	2960.000sqm	@69.68/sqm	206252.80
1.012	5.2.3a			
	Tack Coat Providing and applying tack coat with Bitumen emulsion (RS-1) using emulsion distributor at the rate of 0.25 to 0.30 kg per sqm on the prepared granular surfaces treated with primer & cleaned with Hydraulic broom as per Technical Specification Clause 503.			
	Net Total	2960.000sqm	@14.44/sqm	42742.40
			Heading Total(Rs)	19707013.56
2	**Drain**			

Sl No	Specification	Quantity	Rate	Amount
2.001	13.7.1			
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	1300.000sqm	@393.71/sqm	511823.00
2.002	OD205/2022-2023			
	Laterite boulder masonry with hard departmental stone in foundation and plinth including levelling up with cement concrete 1:6:12 (one cement, six course sand , 12 graded stone aggregate 20mm nominal size),up to plinth level with cement mortar1:6 			
	Net Total	81.400cum	@4610.14/cum	375265.40
			Heading Total(Rs)	887088.40
3	**BM&BC**			
3.001	5.3.2.a			
	Providing and laying bituminous macadam with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading premixed with a bituminous binder (VG 30), transported to the site, laid over a previously prepared surface with paver finisher to the required grade, level, and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction For Grading II - (19 mm nominal size)			
	Net Total	148.000cum	@7787.76/cum	1152588.48
3.002	5.6.2.a			
	Providing and laying bituminous concrete with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with a bituminous binder(NRMB) @ 5.4 percent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level, and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 507 complete in all respects For Grading - II (13.2 mm Nominal Size)			
	Net Total	88.800cum	@12465.77/cum	1106960.38
3.003	8.13			
	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads on Bituminous Surface @ 250 gms per sqm area, the thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35. The finished surface to be level, uniform, and free from streaks and holes.			
	Net Total	148.000sqm	@494.43/sqm	73175.64
3.004	8.35			
	Providing and fixing reflective road studs (Raised Pavement Marker) of ' category A' made out of ASA/HIPS/ABS moulded body with shanks and conforming to ASTM D 4280, strong enough to support a load of more than 13.635 T when tested in accordance with ASTM D 4280, reflective panel confirming to ASTM D 788, and reflectivity conforming to clause 804.4. including installation, drilling, fixing with adhesive etc. with 2 years warranty for the road stud as well as for in field performance as per clause 804.7.3 Road Markers/Road Stud with Lense Reflector :-			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	300.000no	@195.85/no	58755.00
3.005	55.23			
	Supplying and laying interlocking tile 80mm or nearest size thickness, minimum strength M30 including providing a layer of 6mm aggregate for 5cm thickness, then laying interlock cobbles in lines and levels as per the directions of the departmental officers at site inclusive of all cost & conveyance charges etc. complete.			
	Net Total	888.000sqm	@946.36/sqm	840367.68
	Heading Total(Rs)			3231847.18
	Total Estimation PAC			23825949.14
5	**Extra Charges**			
4.001	Provision for GST			
	23825949.14		18.00%	4288670.85
	Grand Total			28114619.99
	Round off			85380.01
	Rounded Total(Rs)			28200000.00
	Rupees Two Crore Eighty Two Lakh			

PRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Construction of Internal Road, Parking area and Drainage facility-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Concrete road & drainage work						
1.001	3.15.2						
	Compacting Original Ground (ii) Compacting original ground supporting subgrade Loosening of the ground upto a level of 300 mm below the subgrade level, watered, graded and compacted in layers to meet requirement of Tables 300.1 and 300.2 for subgrade construction as per Technical Specification Clause 303.5.2.						
	parking Area						
	parking Area	1.000	60.000	23.000	0.500		690.000
		1.000	70.000	42.000	0.500		1470.000
	Total						**2160.000**
	For Road						
	Main road	1.000	370.000	10.000	0.300		1110.000
	Total						**1110.000**
						Total Quantity in cum	**3270.000**
1.002	3.2						
	Preparation of Foundation for Embankment Scarifying Existing Bituminous Surface to a Depth of 150 mm by Mechanical Means Scarifying the existing bituminous road surface to a depth of 150 mm and disposal of scarified material with a lift upto 3 m and lead upto 1000 m as per Technical Specification Clause 301.4.						
	existing road						
		1.000	300.000	4.000			1200.000
	Total						**1200.000**
						Total Quantity in sqm	**1200.000**
1.003	11.1.1.1						
	Excavation for Structures Earthwork in excavation for structures as per drawing and technical specifications Clause 305.1 including setting out, construction of shoring and bracing, removal of stumps and other deleterious material and disposal upto a lead of 50 m, dressing of sides and bottom and backfilling in trenches with excavated suitable material. I. Ordinary soil (i) Upto 3 m depth						
	Drainage						
	Drain around the parking area	1.000	364.000	1.000	0.600		218.400
	Drain from parking area to river	1.000	57.000	1.000	1.000		57.000
	Total						**275.400**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**275.400**
1.004	3.4						
	Construction of Embankment with Material Obtained from Borrow Pits Construction of embankment with approved material obtained from borrow pits with a lift upto 1.5 m, transporting to site, spreading, grading to required slope and compacting to meet requirement of Tables 300.1 and 300.2 with a lead upto 1000 m as per Technical Specification Clause 301.5						
	for road						
	Main road	1.000	370.000	11.600	0.400		1716.800
	Total						**1716.800**
						Total Quantity in cum	**1716.800**
1.005	4.1.A.1						
	Granular Sub-base with Well Graded Material (Table 400.1) (A) By Mix in Place Method Construction of granular sub-base by providing well graded material, spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC, and compacting with smooth wheel roller to achieve the desired density, complete as per Technical Specification Clause 401. (i) For Grading I Material						
	parking Area						
	parking Area	1.000	60.000	23.000	0.150		207.000
		1.000	70.000	42.000	0.150		441.000
	Total						**648.000**
	for Road						
	Main road	2.000	370.000	4.000	0.150		444.000
	Total						**444.000**
						Total Quantity in cum	**1092.000**
1.006	11.4.1.1						
	Providing concrete for plain/reinforced concrete in open foundations complete as per drawings and technical specifications Clause 802, 803, 1202 & 1203 I. P.C.C grade M 10 (i) Nominal mix 1:3:6						
	Parking Area						
	parking Area	1.000	60.000	23.000	0.100		138.000
		1.000	70.000	42.000	0.100		294.000
	Total						**432.000**
	Drainage						
	Drain around the Parking area	1.000	364.000	1.000	0.150		54.600
	drain from parking area to river	1.000	57.000	1.000	0.150		8.550
	Side wall	2.000	364.000	0.250	0.500		91.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Side wall	2.000	57.000	0.250	0.700		19.950
	Total						**174.100**
	For Road						
	Median kerb of road	2.000	370.000	0.300	0.300		66.600
	side kerb	2.000	370.000	0.300	0.200		44.400
	Total						**111.000**
						Total Quantity in cum	**717.100**
1.007	11.4.3.1						
	Providing concrete for plain/reinforced concrete in open foundations complete as per drawings and technical specifications Clause 802, 803, 1202 & 1203 III. P.C.C. grade M 20 (i) Nominal mix (1:2:4)						
	Drainage						
	Drain around the Parking area	1.000	364.000	1.000	0.050		18.200
	drain from parking area to river	1.000	57.000	1.000	0.050		2.850
	Drain around the Parking area Cover slab	1.000	364.000	1.000	0.150		54.600
	Drain from parking area to river cover slab	1.000	57.000	1.000	0.150		8.550
	Total						**84.200**
						Total Quantity in cum	**84.200**
1.008	11.4.5						
	Providing concrete for plain/reinforced concrete in open foundations complete as per drawings and technical specifications Clause 802, 803, 1202 & 1203 V. R.C.C. grade M 25						
	Parking Area						
	parking Area	1.000	60.000	23.000	0.150		207.000
		1.000	70.000	42.000	0.150		441.000
	Guard stone 15cm height 2m c/c on the side of parking area and drain	147.000	0.200	0.200	0.150		0.882
	rounding	1.000	1.118				1.118
	Total						**650.000**
						Total Quantity in cum	**650.000**
1.009	11.8						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying, fitting and placingTMT bar reinforcement in foundation complete as per drawings and technical specifications Clauses 1000 and 1202						
	steel						
	LS Wt taken as 30kg/m3 of concrete for road work	1.000	650.000			0.030000	19.500
	Total						**19.500**
						Total Quantity in tonne	**19.500**
1.010	4.9						
	Wet Mix Macadam Providing, laying, spreading and compacting graded stone aggregate to wet mix macadam specification including premixing the material with water at OMC in mechanical mixer (Pug Mill), carriage of mixed material by tipper to site, laying in uniform layers in sub-base/base course on a well prepared sub-base and compacting with smooth wheel roller of 80 to 100kN weight to achieve the desired density including lighting, barricading and maintenance of diversion, etc as per Tables 400.11 & 400.12 and Technical Specification Clause 406. By Mechanical Means with 1 km lead						
	for road						
	Main road both side	2.000	370.000	4.000	0.150		444.000
	Total						**444.000**
						Total Quantity in cum	**444.000**
1.011	5.1.1a						
	Prime Coat :- Low porosity Providing and applying primer coat with bitumen emulsion (SS-1) on prepared surface of granular base including cleaning of road surface and spraying primer at the rate of 0.70-1.0 kg/sqm using mechanical means as per Technical Specification Clause 502						
	For Road						
	Main road both side	2.000	370.000	4.000			2960.000
	Total						**2960.000**
						Total Quantity in sqm	**2960.000**
1.012	5.2.3a						
	Tack Coat Providing and applying tack coat with Bitumen emulsion (RS-1) using emulsion distributor at the rate of 0.25 to 0.30 kg per sqm on the prepared granular surfaces treated with primer & cleaned with Hydraulic broom as per Technical Specification Clause 503.						
	For Road						
	Main road both side	2.000	370.000	4.000			2960.000
	Total						**2960.000**
						Total Quantity in sqm	**2960.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
2	Drain						
2.001	13.7.1						
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)						
	Drainage						
	Drain around the Parking area	1.000	364.000	2.000			728.000
	drain from parking area to river	1.000	57.000	2.200			125.400
	Total						**853.400**
	For Road						
	boundary wall of road	2.000	370.000	0.600			444.000
	rounding	1.000	2.600				2.600
	Total						**446.600**
						Total Quantity in sqm	**1300.000**
2.002	OD205/2022-2023						
	Laterite boulder masonry with hard departmental stone in foundation and plinth including levelling up with cement concrete 1:6:12 (one cement, six course sand , 12 graded stone aggregate 20mm nominal size),up to plinth level with cement mortar1:6 						
	For Road						
	Boundary wall of the road	2.000	370.000	0.350	0.200		51.800
		2.000	370.000	0.200	0.200		29.600
	Total						**81.400**
						Total Quantity in cum	**81.400**
3	BM&BC						
3.001	5.3.2.a						
	Providing and laying bituminous macadam with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading premixed with a bituminous binder (VG 30), transported to the site, laid over a previously prepared surface with paver finisher to the required grade, level, and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction For Grading II - (19 mm nominal size)						
	Road on both sides						
		2.000	370.000	4.000	0.050		148.000
	Total						**148.000**
						Total Quantity in cum	**148.000**
3.002	5.6.2.a						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and laying bituminous concrete with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with a bituminous binder(NRMB) @ 5.4 percent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level, and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 507 complete in all respects For Grading - II (13.2 mm Nominal Size)						
	road both sides						
		2.000	370.000	4.000	0.030		88.800
	Total						**88.800**
						Total Quantity in cum	**88.800**
3.003	8.13						
	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads on Bituminous Surface @ 250 gms per sqm area, the thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35. The finished surface to be level, uniform, and free from streaks and holes.						
	line marks on sides						
		2*2	370.000	0.100			148.000
	Total						**148.000**
						Total Quantity in sqm	**148.000**
3.004	8.35						
	Providing and fixing reflective road studs (Raised Pavement Marker) of ' category A' made out of ASA/HIPS/ABS moulded body with shanks and conforming to ASTM D 4280, strong enough to support a load of more than 13.635 T when tested in accordance with ASTM D 4280, reflective panel confirming to ASTM D 788, and reflectivity conforming to clause 804.4. including installation, drilling, fixing with adhesive etc. with 2 years warranty for the road stud as well as for in field performance as per clause 804.7.3 Road Markers/Road Stud with Lense Reflector :-						
	for road sides						
	LS qty taken as 300	300.000					300.000
	Total						**300.000**
						Total Quantity in no	**300.000**
3.005	55.23						
	Supplying and laying interlocking tile 80mm or nearest size thickness, minimum strength M30 including providing a layer of 6mm aggregate for 5cm thickness, then laying interlock cobbles in lines and levels as per the directions of the departmental officers at site inclusive of all cost & conveyance charges etc. complete.						
	side berm						
		2.000	370.000	1.200			888.000
	Total						**888.000**
						Total Quantity in sqm	**888.000**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of Toilet block inside the Harbour-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Toilet Block**			
1.001	2.8.1			
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil			
	Net Total	79.230cum	@291.42/cum	23089.21
1.002	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	12.912cum	@6687.21/cum	86345.26
1.003	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	43.371cum	@7069.78/cum	306623.43
1.004	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	13.495cum	@9237.20/cum	124656.01
1.005	5.34.1			
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	27.592cum	@80.55/cum	2222.54
1.006	2.25			

Sl No	Specification	Quantity	Rate	Amount
	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m.			
	Net Total	21.577cum	@253.71/cum	5474.30
1.007	4.1.6			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)			
	Net Total	5.524cum	@7076.05/cum	39088.10
1.008	50.6.7.2			
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.			
	Net Total	31.496cum	@7872.96/cum	247966.75
1.009	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	14.097cum	@10858.36/cum	153070.30
1.010	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	25.200sqm	@329.03/sqm	8291.56
1.011	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	89.860sqm	@637.63/sqm	57297.43
1.012	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	75.135sqm	@800.47/sqm	60143.31
1.013	OD5549/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo -HCR			
	Net Total	2207.360kilogram	@96.62/kilogram	213275.12

Sl No	Specification	Quantity	Rate	Amount
1.014	13.1.1			
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	273.580sqm	@308.22/sqm	84322.83
1.015	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	87.550sqm	@262.57/sqm	22988.00
1.016	13.43.1			
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer			
	Net Total	155.580sqm	@69.33/sqm	10786.36
1.017	13.83.2			
	Wall painting with premium acrylic emulsion paint of interior grade, having VOC (Volatile including applying additional coats wherever required to achieve even shade and colour.Two coats			
	Net Total	146.880sqm	@131.59/sqm	19327.94
1.018	13.47.1			
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)			
	Net Total	99.830sqm	@186.15/sqm	18583.35
1.019	11.46.1			
	Providing and laying Vitrified tiles indifferent sizes (thickness to be specified by manufacturer), with water absorption less than 0.08 % and conforming to I.S. 15622, of approved make, in all colours & shade, in skirting, riser of steps, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand), including grouting the joint with white cement & matching pigments etc. complete.Size of Tile 500x500 mm			
	Net Total	112.930sqm	@1516.68/sqm	171278.67
1.020	50.9.1.1			
	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately), using good quality Anjili wood /jack wood			
	Net Total	0.187cum	@109412.10/cum	20460.06
1.021	50.9.3.1			
	Providing and fixing paneled or paneled and glazed shutters for doors, windows and clerestory windows, 30 mm thick shutters including ISI marked M.S. pressed butt hinges bright finished of required size with necessary screws, excluding paneling which will be paid for separately, all complete as per direction 0f Engineer in- charge. using Anjili/ Jack wood			
	Net Total	5.071sqm	@3002.91/sqm	15227.76
1.022	50.9.4.1			

Sl No	Specification	Quantity	Rate	Amount
	Providing and fixing paneling or paneling and glazing in paneled or paneled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured) paneling for paneled or paneled and glazed shutters 25 mm to 40 mm thick using good quality Anjili/ Jack wood			
	Net Total	0.986sqm	@2725.35/sqm	2687.20
1.023	50.9.5.1			
	Providing and fixing glazed shutters for doors, windows and clerestory windows using 4 mm thick float glass panes including ISI marked M.S pressed butt hinges bright finished of required size with necessary screws. Using Anjili wood/ jack wood 35 mm thick shutters.			
	Net Total	3.280sqm	@3924.72/sqm	12873.08
1.024	9.48.2			
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc			
	Net Total	44.100kg	@211.94/kg	9346.55
1.025	9.53			
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	10.000each	@207.00/each	2070.00
1.026	9.117.2			
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 42x50 mm			
	Net Total	20.000metre	@308.89/metre	6177.80
1.027	9.118.1			
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and			

Sl No	Specification	Quantity	Rate	Amount
	fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).			
	Net Total	6.720sqm	@2033.68/sqm	13666.33
1.028	50.9.15.1			
	Supplying and fixing 200 mm Aluminium aldrop			
	Net Total	5.000no	@171.51/no	857.55
1.029	9.63.3			
	Providing and fixing ISI marked oxidised M.S. tower bolt black finish, (Barrel type) with necessary screws etc. complete:150x10 mm			
	Net Total	5.000no	@60.70/no	303.50
1.030	14.35.3			
	Providing and fixing finished brass hard drawn hooks and eyes:200 mm			
	Net Total	14.000no	@85.95/no	1203.30
1.031	14.35.5			
	Providing and fixing finished brass hard drawn hooks and eyes:100 mm			
	Net Total	11.000no	@60.44/no	664.84
1.032	9.66.1			
	Providing and fixing ISI marked oxidised M.S. handles conforming to IS : 4992 with necessary screws etc. complete:125 mm			
	Net Total	1.000no	@40.27/no	40.27
1.033	13.85.1			
	Applying priming coats with primer of approved brand and manufacture, having low VOC (Volatile Organic Compound) content.With ready mixed pink or grey primer on wood work (hard and soft wood) having VOC content less than 50 grams/ litre			
	Net Total	12.516sqm	@65.91/sqm	824.93
1.034	13.61.1			
	Painting with synthetic enamel paint of approved brand and manufacture to give an even shade:Two or more coats on new work			
	Net Total	11.318sqm	@140.37/sqm	1588.71
1.035	13.52.1			
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work			
	Net Total	13.945sqm	@219.17/sqm	3056.33
1.036	17.3.2			
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.c. pan with ISI marked black solid plastic seat			

Sl No	Specification	Quantity	Rate	Amount
	and lid			
	Net Total	4.000each	@7582.40/each	30329.60
1.037	50.17.1.4			
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.			
	Net Total	4.000no	@758.07/no	3032.28
1.038	17.4.1			
	Providing and fixing white vitreous china flat back or wall corner type lipped front urinal basin of 430x260x350 mm and 340x410x265 mm sizes respectively with automatic flushing cistern with standard flush pipe and C.P. brass spreaders with brass unions and G.I. clamps complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required:One urinal basin with 5 litre white P.V.C. automatic flushing cistern			
	Net Total	4.000each	@5754.71/each	23018.84
1.039	17.7.2			
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 630 x 450 mm with a single 15 mm C.P. brass pillar tap			
	Net Total	6.000each	@3177.85/each	19067.10
1.040	18.48			
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.			
	Net Total	3000.000Litre	@10.18/Litre	30540.00
1.041	50.18.9.9.2			
	Providing and fixing PVC pipes includes joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in CHarge. 110 mm dia 4 Kg/cm2			
	Net Total	50.000metre	@471.14/metre	23557.00
1.042	50.18.9.7.2			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge.63 mm dia 4 Kgf/cm2			
	Net Total	50.000metre	@300.47/metre	15023.50
1.043	50.18.7.4.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 10Kgf/cm2- Internal work - Exposed on wall			
	Net Total	150.000metre	@313.08/metre	46962.00

Sl No	Specification	Quantity	Rate	Amount
1.044	50.18.8.3.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 25 mm pipe 10kgf /cm2			
	Net Total	150.000metre	@414.35/metre	62152.50
1.045	50.18.9.20.3			
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 63 mm dia Door Elbow			
	Net Total	6.000no	@79.76/no	478.56
1.046	50.18.9.22.3			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement-110 mm dia Door Elbow			
	Net Total	4.000no	@131.22/no	524.88
1.047	50.18.9.22.4			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement- 110 mm dia Bend			
	Net Total	4.000no	@160.26/no	641.04
1.048	50.18.9.22.6			
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 110x110x110 mm dia Door tee			
	Net Total	4.000no	@186.75/no	747.00
1.049	50.17.1.1			
	Supplying and fixing Stainless steel soap dish including cost of materials and labour charges etc complete as per the direction of site Engineer-in-charge.			
	Net Total	10.000no	@66.98/no	669.80
1.050	50.17.1.3			
	Supplying and fixing CP Towel rod 60cm or nearest available length including cost of materials and labour charges etc complete as per the direction of site Engineer-in-charge.			
	Net Total	6.000no	@128.14/no	768.84
1.051	50.18.9.21.7			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Vent cowl			
	Net Total	4.000no	@86.15/no	344.60
1.052	18.58.1.1			
	Providing and fixing PTMT grating of approved quality and colour. Circular type100 mm nominal dia			
	Net Total	10.000each	@43.76/each	437.60
1.053	19.4.1.1			
	Providing and fixing square-mouth S.W. gully trap class SP -1 complete with C.I. grating brick masonry chamber with water tight C.I. cover with frame of 300x300 mm size (inside) the weight of cover to be not less than 4.50 kg and frame to be not less than 3.20 kg as per standard design: 100x100 mm size P typeWith common burnt clay F.P.S. (non modular) bricks of class designation 7.5			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	4.000each	@2664.66/each	10658.64
1.054	18.18.2			
	Providing and fixing ball valve (brass) of approved quality, High or low pressure, with plastic floats complete:20 mm nominal bore			
	Net Total	5.000each	@446.34/each	2231.70
1.055	18.51.1			
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore			
	Net Total	20.000each	@637.96/each	12759.20
1.056	17.31			
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.			
	Net Total	2.000each	@1481.95/each	2963.90
1.057	10.3			
	Providing and fixing in position collapsible steel shutters with vertical channels 20x10x2 mm and braced with flat iron diagonals 20x5 mm size, with top and bottom rail of T-iron 40x40x6 mm, with 40 mm dia steel pulleys, complete with bolts, nuts,locking arrangement, stoppers, handles, including applying a priming coat of approved steel primer .			
	Net Total	4.500sqm	@10014.78/sqm	45066.51
1.058	19.7.1.2			
	Constructing brick masonry manhole in cement mortar 1:4 (1 cement : 4 coarse sand) with R.C.C. top with 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size), foundation concrete 1:4:8 mix (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size,) inside plastering 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with floating coat of neat cement and making channels in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement complete as per standard design: Inside size 90x80 cm and 45 cm deep including C.I. cover with frame (light duty) 455x610 mm internal dimensions, total weight of cover and frame to be not less than 38 kg (weigh of cover 23 kg and weight of frame 15 kg):With Sewer bricks conforming to IS : 4885			
	Net Total	1.000each	@12608.11/each	12608.11
1.059	19.33			
	Constructing soak pit 1.20x1.20 m filled with brickbats including S.W. drain pipe 100 mm diameter and 1.20 m long complete as per standard design.			
	Net Total	3.000each	@3012.28/each	9036.84
1.060	19.15.1			
	Providing M.S. foot rests including fixing in manholes with 20x20x10 cm cement concrete blocks 1:3:6 (1 cement : 3 coarse sand: 6 graded stone aggregate 20 mm nominal size) as per standard design.With 20x20 mm square bar			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	1.000each	@487.68/each	487.68
1.061	10.2			
	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.			
	Net Total	117.400kg	@117.55/kg	13800.37
	Heading Total(Rs)			2113786.77
	Total Estimation PAC			2113786.77
3	**Extra Charges**			
2.001	Provision for GST			
	2113786.77		18.00%	380481.62
	Grand Total			2494268.39
	Round off			5731.61
	Rounded Total(Rs)			2500000.00
	Rupees Twenty Five Lakh			

PRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of Toilet block inside the Harbour-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Toilet Block						
1.001	2.8.1						
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil						
	Earthwork						
	Long wall	2.000	13.900	0.800	0.750		16.680
	Short wall	3.000	4.800	0.800	0.750		8.640
	Tank- LW	2.000	3.400	0.800	0.750		4.080
	Tank -SW	2.000	1.500	0.800	0.750		1.800
	W/C - LW	4.000	2.000	0.800	0.750		4.800
	W/C - SW	3.000	1.700	0.800	0.750		3.060
	Wash area- LW	1.000	1.900	0.800	0.750		1.140
	Wash area- SW	1.000	1.700	0.800	0.750		1.020
	Wash area- LW	1.000	1.900	0.800	0.750		1.140
	Cloak room- LW	1.000	3.300	0.800	0.750		1.980
	Cloak room- SW	1.000	1.800	0.800	0.750		1.080
	Courtyard	1.000	1.400	0.800	0.750		0.840
	Step	1.000	1.500	0.600	0.150		0.135
	Step	1.000	2.000	0.600	0.150		0.180
	Septic tank	1.000	5.500	2.100	1.500		17.325
	Soak pit	3.000	1.400	1.400	1.000		5.880
	Column	6.000	1.500	1.500	0.700		9.450
	Total						**79.230**
						Total Quantity in cum	**79.230**
1.002	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	PCC						
	Long wall	2.000	13.900	0.800	0.150		3.336
	Short wall	3.000	4.800	0.800	0.150		1.728

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Tank- LW	2.000	3.400	0.800	0.150		0.816
	Tank -SW	2.000	1.500	0.800	0.150		0.360
	W/C - LW	4.000	2.000	0.800	0.150		0.960
	W/C - SW	3.000	1.700	0.800	0.150		0.612
	Wash area- LW	1.000	1.900	0.800	0.150		0.228
	Wash area- SW	1.000	1.700	0.800	0.150		0.204
	Wash area- LW	1.000	1.900	0.800	0.150		0.228
	Cloak room- LW	1.000	3.300	0.800	0.150		0.396
	Cloak room- SW	1.000	1.800	0.800	0.150		0.216
	Courtyard	1.000	1.400	0.800	0.150		0.168
	Column	6.000	1.500	1.500	0.100		1.350
	Septic tank	1.000	5.500	2.100	0.200		2.310
	Total						**12.912**
						Total Quantity in cum	**12.912**
1.003	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	RR masonry						
	Foundation-Long wall	2.000	13.900	0.600	0.600		10.008
	Foundation-Short wall	3.000	4.800	0.600	0.600		5.184
	Foundation-Tank- LW	2.000	3.400	0.600	0.600		2.448
	Foundation-Tank -SW	2.000	1.500	0.600	0.600		1.080
	Foundation-W/C - LW	4.000	2.000	0.600	0.600		2.880
	Foundation-W/C - SW	3.000	1.700	0.600	0.600		1.836
	Foundation-Wash area- LW	1.000	1.900	0.600	0.600		0.684
	Foundation-Wash area- SW	1.000	1.700	0.600	0.600		0.612
	Foundation-Wash area- LW	1.000	1.900	0.600	0.600		0.684
	Foundation-Cloak room- LW	1.000	3.300	0.600	0.600		1.188
	Foundation-Cloak room- SW	1.000	1.800	0.600	0.600		0.648

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Foundation-Courtyard	1.000	1.400	0.600	0.600		0.504
	Basement-Long wall	2.000	13.900	0.450	0.450		5.630
	Basement-Short wall	3.000	4.800	0.450	0.450		2.916
	Basement-Tank-LW	2.000	3.400	0.450	0.450		1.377
	Basement-Tank - SW	2.000	1.500	0.450	0.450		0.608
	Basement-W/C - LW	4.000	2.000	0.450	0.450		1.620
	Basement-W/C - SW	3.000	1.700	0.450	0.450		1.033
	Basement-Wash area- LW	1.000	1.900	0.450	0.450		0.385
	Basement-Wash area- SW	1.000	1.700	0.450	0.450		0.344
	Basement-Wash area- LW	1.000	1.900	0.450	0.450		0.385
	Basement-Cloak room- LW	1.000	3.300	0.450	0.450		0.668
	Basement-Cloak room- SW	1.000	1.800	0.450	0.450		0.365
	Basement-Courtyard	1.000	1.400	0.450	0.450		0.284
	Total						**43.371**
						Total Quantity in cum	**43.371**
1.004	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	Rcc up to plinth level						
	Basement-Long wall	2.000	13.900	0.450	0.100		1.251
	Basement-Short wall	3.000	4.800	0.450	0.100		0.648
	Basement-Tank-LW	2.000	3.400	0.450	0.100		0.306

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Basement-Tank - SW	2.000	1.500	0.450	0.100		0.135
	Basement-W/C - LW	4.000	2.000	0.450	0.100		0.360
	Basement-W/C - SW	3.000	1.700	0.450	0.100		0.230
	Basement-Wash area- LW	1.000	1.900	0.450	0.100		0.086
	Basement-Wash area- SW	1.000	1.700	0.450	0.100		0.077
	Basement-Wash area- LW	1.000	1.900	0.450	0.100		0.086
	Basement-Cloak room- LW	1.000	3.300	0.450	0.100		0.149
	Basement-Cloak room- SW	1.000	1.800	0.450	0.100		0.081
	Basement-Courtyard	1.000	1.400	0.450	0.100		0.063
	Column footing	6.000	1.400	1.400	0.300		3.528
		6.000	0.800	0.800	0.300		1.152
	Septic tank bed	1.000	5.300	1.900	0.150		1.511
	Side wall	1.000	14.400	0.150	1.700		3.672
	Baffle wall	2.000	1.600	0.050	1.000		0.160
	Total						**13.495**
						Total Quantity in cum	**13.495**
1.005	5.34.1						
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	Rcc up to plinth level						
	Basement-Long wall	2.000	13.900	0.450	0.100		1.251
	Basement-Short wall	3.000	4.800	0.450	0.100		0.648
	Basement-Tank-LW	2.000	3.400	0.450	0.100		0.306
	Basement-Tank - SW	2.000	1.500	0.450	0.100		0.135
	Basement-W/C - LW	4.000	2.000	0.450	0.100		0.360
	Basement-W/C - SW	3.000	1.700	0.450	0.100		0.230

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Basement-Wash area- LW	1.000	1.900	0.450	0.100		0.086
	Basement-Wash area- SW	1.000	1.700	0.450	0.100		0.077
	Basement-Wash area- LW	1.000	1.900	0.450	0.100		0.086
	Basement-Cloak room- LW	1.000	3.300	0.450	0.100		0.149
	Basement-Cloak room- SW	1.000	1.800	0.450	0.100		0.081
	Basement-Courtyard	1.000	1.400	0.450	0.100		0.063
	Column footing	6.000	1.400	1.400	0.300		3.528
		6.000	0.800	0.800	0.300		1.152
	Septic tank bed	1.000	5.300	1.900	0.150		1.511
	Side wall	1.000	14.400	0.150	1.700		3.672
	Baffle wall	2.000	1.600	0.050	1.000		0.160
	Total						**13.495**
	Lintel						
		2.000	8.400	0.200	0.150		0.504
		1.000	3.000	0.200	0.150		0.090
		3.000	5.000	0.200	0.150		0.450
		1.000	6.600	0.200	0.150		0.198
	Total						**1.242**
	Beam						
		2.000	8.400	0.300	0.300		1.512
		3.000	3.000	0.300	0.300		0.810
	Total						**2.322**
	Sunshade						
		1.000	8.400	0.600	0.100		0.504
		1.000	3.000	0.600	0.100		0.180
		1.000	5.000	0.600	0.100		0.300
		1.000	6.600	0.600	0.100		0.396
	Total						**1.380**
	Roof						
	Roof	1.000	8.900	5.600	0.150		7.476
	Deduction-courtyard	-1.000	2.000	1.700	0.150		-0.510
	Deduction- wash area	-1.000	1.800	1.100	0.150		-0.297

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**6.669**
	column						
		6.000	0.400	0.300	3.450		2.484
	Total						**2.484**
						Total Quantity in cum	**27.592**
1.006	2.25						
	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m.						
	Earth filling						
	Bath area & wash area	1.000	10.300	1.100	0.250		2.833
	Bath area	1.000	1.000	3.000	0.250		0.750
	Tank and passage around	1.000	2.900	3.700	0.450		4.829
	Passage	1.000	2.600	0.600	0.450		0.702
	w/c	4.000	1.800	1.200	0.450		3.888
	Cloak room	1.000	1.800	2.300	0.450		1.863
	Courtyard	1.000	2.000	1.700	0.450		1.530
	Wash area	1.000	1.200	0.800	0.250		0.240
	Wash area	1.000	1.400	0.800	0.250		0.280
	Passage + hand wash area	1.000	3.300	2.400	0.450		3.564
	Passage + urinal	1.000	2.000	0.800	0.450		0.720
	Passage infront of wash area	1.000	0.600	1.400	0.450		0.378
	Total						**21.577**
						Total Quantity in cum	**21.577**
1.007	4.1.6						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)						
	CC Flooring						
	Bath area & wash area	1.000	10.300	1.100	0.100		1.133
	Bath area	1.000	1.000	3.000	0.100		0.300
	Tank and passage around	1.000	2.900	3.700	0.100		1.073
	Passage	1.000	2.600	0.600	0.100		0.156
	w/c	4.000	1.800	1.200	0.100		0.864

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Cloak room	1.000	1.800	2.300	0.100		0.414
	Courtyard	1.000	2.000	1.700	0.100		0.340
	Wash area	1.000	1.200	0.800	0.100		0.096
	Wash area	1.000	1.400	0.800	0.100		0.112
	Passage + hand wash area	1.000	3.300	2.400	0.100		0.792
	Passage + urinal	1.000	2.000	0.800	0.100		0.160
	Passage infront of wash area	1.000	0.600	1.400	0.100		0.084
	Total						**5.524**
						Total Quantity in cum	**5.524**
1.008	50.6.7.2						
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.						
	Laterite masonry						
	Bath area	1.000	16.500	0.100	1.000		1.650
	Cloak room-front wall	1.000	2.900	0.100	1.000		0.290
	Cloak room	1.000	7.000	0.200	3.000		4.200
	outer wall- LW	1.000	8.300	0.200	3.000		4.980
	outer wall-SW	1.000	5.000	0.200	3.000		3.000
	W/C - LW	2.000	8.300	0.200	3.000		9.960
	W/C - SW	4.000	1.200	0.200	3.000		2.880
	Wash area	2.000	2.400	0.200	3.000		2.880
	urinal	1.000	0.600	0.200	3.000		0.360
	wall near step	2.000	0.200	0.200	3.000		0.240
	Basement-Outer wall	1.000	40.000	0.450	0.450		8.100
	Basement-Wash area	2.000	4.000	0.450	0.450		1.620
	Basement-Cloak room- LW	2.000	3.300	0.450	0.450		1.337
	Basement-Cloak room- SW	2.000	1.800	0.450	0.450		0.729
	Basement-Courtyard	1.000	5.000	0.450	0.450		1.013
	Basement-urinal	1.000	0.600	0.450	0.450		0.122
	Step	1.000	1.500	0.600	0.300		0.270
		1.000	1.500	0.300	0.300		0.135
	Step	1.000	2.000	0.600	0.300		0.360

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		1.000	2.000	0.300	0.300		0.180
	Deduction - Door	-4.000	1.000		2.100		-8.400
	Deduction - window	-1.000	1.500		1.500		-2.250
	Deduction - ventilator	-4.000	0.900		0.600		-2.160
	Total						**31.496**
						Total Quantity in cum	**31.496**
1.009	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	Lintel						
		2.000	8.400	0.200	0.150		0.504
		1.000	3.000	0.200	0.150		0.090
		3.000	5.000	0.200	0.150		0.450
		1.000	6.600	0.200	0.150		0.198
	Total						**1.242**
	Beam						
		2.000	8.400	0.300	0.300		1.512
		3.000	3.000	0.300	0.300		0.810
	Total						**2.322**
	Sunshade						
		1.000	8.400	0.600	0.100		0.504
		1.000	3.000	0.600	0.100		0.180
		1.000	5.000	0.600	0.100		0.300
		1.000	6.600	0.600	0.100		0.396
	Total						**1.380**
	Roof						
	Roof	1.000	8.900	5.600	0.150		7.476
	Deduction- courtyard	-1.000	2.000	1.700	0.150		-0.510
	Deduction- wash area	-1.000	1.800	1.100	0.150		-0.297
	Total						**6.669**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	column						
		6.000	0.400	0.300	3.450		2.484
	Total						**2.484**
						Total Quantity in cum	**14.097**
1.010	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	centering and suttering						
	Column	6.000	1.400		3.000		25.200
	Total						**25.200**
						Total Quantity in sqm	**25.200**
1.011	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	shuttering						
	Lintel	2.000	34.800		0.150		10.440
		2.000	7.800		0.150		2.340
	Beam Bottom	2.000	16.800	0.300			10.080
	Side	2.000	16.800		0.150		5.040
	Beam Bottom	2.000	9.600	0.300			5.760
	Side	2.000	9.600		0.150		2.880
	Septic tank outside all round	1.000	14.400		1.700		24.480
	Septic tank inside all round	1.000	13.200		1.700		22.440
	Baffle wall	4.000	1.600		1.000		6.400
	Total						**89.860**
						Total Quantity in sqm	**89.860**
1.012	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	centering and shuttering						
	Roof slab Bottom	1.000	8.000	3.000			24.000
	Roof slab Bottom	1.000	5.000	2.300			11.500
	Roof slab Side	1.000	28.500		0.150		4.275
	Septic tank cover	1.000	5.000	1.600			8.000
	Septic tank all side	1.000	14.400		1.700		24.480

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Septic tank all side	1.000	14.400	0.200			2.880
	Total						**75.135**
						Total Quantity in sqm	**75.135**
1.013	OD5549/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo -HCR						
	steel						
	LS quantity of 80kg/m3	27.592				80.000000	2207.360
	Total						**2207.360**
						Total Quantity in kilogram	**2207.360**
1.014	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	Wall plastering						
	Bath area internal wall	2.000	4.800		1.000		9.600
	Bath area external wall	2.000	5.000		1.000+.1		11.000
	Bath area internal wall	1.000	6.800		1.000		6.800
	Bath area external wall	1.000	6.900		1.000+.1		7.590
	Tank internal long wall	2.000	2.700		1.000		5.400
	Tank external long wall	2.000	2.900		1.000+.2		6.960
	Tank internal short wall	1.000	1.500		1.000		1.500
	Tank external short wall	1.000	1.900		1.000+.2		2.280
	External long wall	1.000	8.400		3.000		25.200
	External short wall	2.000	3.400		3.000		20.400
	W/C internal long wall	12.000	1.800		3.000		64.800
	W/C internal short wall	8.000	1.200		3.000		28.800
	Wash area wall	3.000	1.400		3.000		12.600
	Cloak room long wall	3.000	2.500		3.000		22.500

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Cloak room short wall	1.000	1.800		3.000		5.400
	Cloak room half wall	2.000	2.700		1.000+.2		6.480
	Urinal long wall	1.000	2.000		3.000		6.000
	Urinal short wall	1.000	0.800		3.000		2.400
	Courtyard wall	1.000	3.400		3.000		10.200
	Wash area long wall	1.000	1.400		3.000		4.200
	Wash area short wall	2.000	1.000		3.000		6.000
	Basement	2.000	14.000		0.450		12.600
		2.000	5.000		0.450		4.500
	Step	2.000	1.500		0.600		1.800
		2.000	0.900		0.300		0.540
	Step	2.000	2.000		0.600		2.400
		2.000	0.900		0.300		0.540
	Deduction - Door	-4.000	1.000		2.100		-8.400
	Deduction - window	-1.000	1.500		1.500		-2.250
	Deduction - ventilator	-4.000	0.900		0.600		-2.160
	Deduction - step	-1.000	1.500		0.600		-0.900
	Deduction - step	-1.000	2.000		0.600		-1.200
	Total						**273.580**
						Total Quantity in sqm	**273.580**
1.015	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	Ceiling						
	W/C	4.000	1.800	1.200			8.640
	Wash area	1.000	1.400	1.500			2.100
	Cloak room	1.000	2.300	1.800			4.140
	Urinal	1.000	2.500	0.800			2.000
	Hand wash area	1.000	3.300	2.400			7.920
	Courtyard wall	1.000	2.000	1.700			3.400
	Hand wash area	1.000	1.800	1.500			2.700
	Beam	4.000	3.600	0.900			12.960
		3.000	2.700	0.900			7.290
	Sunshade long wall	1.000	9.600	1.300			12.480

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Sunshade short wall	1.000	5.600	1.300			7.280
		1.000	3.800	1.300			4.940
		1.000	2.400	1.300			3.120
		1.000	6.600	1.300			8.580
	Total						**87.550**
						Total Quantity in sqm	**87.550**
1.016	13.43.1						
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	Primer						
	W/C internal long wall	12.000	1.800		3.000		64.800
	W/C internal short wall	8.000	1.200		3.000		28.800
	Wash area wall	3.000	1.400		3.000		12.600
	Cloak room long wall	3.000	2.500		3.000		22.500
	Cloak room short wall	1.000	1.800		3.000		5.400
	Cloak room half wall	1.000	2.700		1.000+.2		3.240
	Urinal long wall	1.000	2.000		3.000		6.000
	Urinal short wall	1.000	0.800		3.000		2.400
	Courtyard wall	1.000	3.400		3.000		10.200
	Wash area long wall	1.000	1.400		3.000		4.200
	Wash area short wall	2.000	1.000		3.000		6.000
	Deduction - Door	-4.000	1.000		2.100		-8.400
	Deduction - window	-1.000	1.500		1.500		-2.250
	Deduction - ventilator	-4.000	0.900		0.600		-2.160
	Deduction - step	-1.000	1.500		0.600		-0.900
	Deduction - step	-1.000	2.000		0.600		-1.200
	W/C	4.000	1.800	1.200			8.640
	Wash area	1.000	1.400	1.500			2.100
	Cloak room	1.000	2.300	1.800			4.140
	Urinal	1.000	2.500	0.800			2.000
	Hand wash area	1.000	3.300	2.400			7.920

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Courtyard wall	1.000	2.000	1.700			3.400
	Hand wash area	1.000	1.800	1.500			2.700
	Beam	4.000	3.600	0.900			12.960
		3.000	2.700	0.900			7.290
	Deduction w/c wall	-12.000	1.800		1.500		-32.400
	Deduction w/c wall	-8.000	1.200		1.500		-14.400
	Total						**155.580**
						Total Quantity in sqm	**155.580**
1.017	13.83.2						
	Wall painting with premium acrylic emulsion paint of interior grade, having VOC (Volatile including applying additional coats wherever required to achieve even shade and colour.Two coats						
	Interior painting						
	W/C internal long wall	8.000	1.800		3.000		43.200
	W/C internal short wall	8.000	1.200		3.000		28.800
	Wash area wall	3.000	1.400		3.000		12.600
	Cloak room long wall	3.000	2.500		3.000		22.500
	Cloak room short wall	1.000	1.800		3.000		5.400
	Cloak room half wall	1.000	2.700		1.000+.2		3.240
	Urinal long wall	1.000	2.000		3.000		6.000
	Urinal short wall	1.000	0.800		3.000		2.400
	Courtyard wall	1.000	3.400		3.000		10.200
	Wash area long wall	1.000	1.400		3.000		4.200
	Wash area short wall	2.000	1.000		3.000		6.000
	Deduction - Door	-4.000	1.000		2.100		-8.400
	Deduction - window	-1.000	1.500		1.500		-2.250
	Deduction - ventilator	-4.000	0.900		0.600		-2.160
	W/C	4.000	1.800	1.200			8.640
	Wash area	1.000	1.400	1.500			2.100
	Cloak room	1.000	2.300	1.800			4.140
	Urinal	1.000	2.500	0.800			2.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Hand wash area	1.000	3.300	2.400			7.920
	Courtyard wall	1.000	2.000	1.700			3.400
	Hand wash area	1.000	1.800	1.500			2.700
	Beam	4.000	3.600	0.900			12.960
		3.000	2.700	0.900			7.290
	Deduction w/c wall	-8.000	1.800		1.500		-21.600
	Deduction w/c wall	-8.000	1.200		1.500		-14.400
	Total						**146.880**
						Total Quantity in sqm	**146.880**
1.018	13.47.1						
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)						
	Exterior painting						
	Bath area external wall	2.000	5.000		1.000+.1		11.000
	Bath area internal wall	1.000	6.800		1.000		6.800
	Bath area external wall	1.000	6.900		1.000+.1		7.590
	Tank internal short wall	1.000	1.500		1.000		1.500
	External long wall	1.000	8.400		3.000		25.200
	External short wall	2.000	3.400		3.000		20.400
	Wash area wall	3.000	1.400		3.000		12.600
	Basement	2.000	14.000		0.500		14.000
		2.000	5.000		0.500		5.000
	Deduction - ventilator	-4.000	0.900		0.600		-2.160
	Deduction - step	-1.000	1.500		0.600		-0.900
	Deduction - step	-1.000	2.000		0.600		-1.200
	Total						**99.830**
						Total Quantity in sqm	**99.830**
1.019	11.46.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and laying Vitrified tiles indifferent sizes (thickness to be specified by manufacturer), with water absorption less than 0.08 % and conforming to I.S. 15622, of approved make, in all colours & shade, in skirting, riser of steps, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand), including grouting the joint with white cement & matching pigments etc. complete.Size of Tile 500x500 mm						
	Wall & floor tiles						
	w/c	4.000	1.800	1.200			8.640
	Cloak room	1.000	20.000	2.500			50.000
	Courtyard	1.000	2.200	1.700			3.740
	Wash area	1.000	1.400	0.900			1.260
	Wash area	1.000	1.600	0.900			1.440
	Passage + hand wash area	1.000	3.500	2.600			9.100
	Passage + urinal	1.000	2.100	0.900			1.890
	Passage infront of wash area	1.000	0.700	1.400			0.980
	Step	2.000	1.500		0.600		1.800
		2.000	0.900		0.300		0.540
	Step	2.000	2.000		0.600		2.400
		2.000	0.900		0.300		0.540
	For wall w/c	4.000	5.100		1.500		30.600
	Total						**112.930**
						Total Quantity in sqm	**112.930**
1.020	50.9.1.1						
	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately), using good quality Anjili wood /jack wood						
	Frame						
	Door - V	1*2	0.100	0.070	2.100		0.029
	Door - H	1*1	1.200	0.070	0.100		0.008
	Window - Verticals	1*4	0.100	0.070	1.500		0.042
	Window- Horizontal	1*2	1.700	0.070	0.100		0.024
	Ventilator	4*2	0.900	0.100	0.070		0.050
	Ventilator	4*2	0.600	0.100	0.070		0.034
	Total						**0.187**
						Total Quantity in cum	**0.187**
1.021	50.9.3.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing paneled or paneled and glazed shutters for doors, windows and clerestory windows, 30 mm thick shutters including ISI marked M.S. pressed butt hinges bright finished of required size with necessary screws, excluding paneling which will be paid for separately, all complete as per direction 0f Engineer in- charge. using Anjili/ Jack wood						
	Shutter						
	Door	1.000	2.000		1.000		2.000
	Window	1*3	0.410		1.360		1.673
	Ventilator	4.000	0.460		0.760		1.398
	Total						**5.071**
						Total Quantity in sqm	**5.071**
1.022	50.9.4.1						
	Providing and fixing paneling or paneling and glazing in paneled or paneled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured) paneling for paneled or paneled and glazed shutters 25 mm to 40 mm thick using good quality Anjili/ Jack wood						
	Panel						
	Door	4.000	0.850	0.290			0.986
	Total						**0.986**
						Total Quantity in sqm	**0.986**
1.023	50.9.5.1						
	Providing and fixing glazed shutters for doors, windows and clerestory windows using 4 mm thick float glass panes including ISI marked M.S pressed butt hinges bright finished of required size with necessary screws. Using Anjili wood/ jack wood 35 mm thick shutters.						
	window glass						
	window	1*3	1.400	0.400			1.680
	ventilator	1*4	0.800	0.500			1.600
	Total						**3.280**
						Total Quantity in sqm	**3.280**
1.024	9.48.2						
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc						
	window grill						
	window- LS qty 10kg/m2	1*3	1.500	0.500		10.000000	22.500
	ventilator- LS qty 10kg/m2	1*4	0.900	0.600		10.000000	21.600
	Total						**44.100**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in kg	**44.100**
1.025	9.53						
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	Iron holdfast						
	Door - D	6.000					6.000
	Window	4.000					4.000
	Total						**10.000**
						Total Quantity in each	**10.000**
1.026	9.117.2						
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 42x50 mm						
	uPVC Door frame						
	Toilet	4*1	5.000				20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
1.027	9.118.1						
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).						
	uPVC Door shutter						
	Door	4*1	0.800		2.100		6.720
	Total						**6.720**
						Total Quantity in sqm	**6.720**
1.028	50.9.15.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying and fixing 200 mm Aluminium aldrop						
	Aldrop						
	Door	5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
1.029	9.63.3						
	Providing and fixing ISI marked oxidised M.S. tower bolt black finish, (Barrel type) with necessary screws etc. complete:150x10 mm						
	Tower bolt						
	Door	5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
1.030	14.35.3						
	Providing and fixing finished brass hard drawn hooks and eyes:200 mm						
	Hooks and Eyes 200mm						
	window stay	6.000					6.000
	ventilator	8.000					8.000
	Total						**14.000**
						Total Quantity in no	**14.000**
1.031	14.35.5						
	Providing and fixing finished brass hard drawn hooks and eyes:100 mm						
	Hooks and Eyes 100mm						
	window shutter	3.000					3.000
	ventilator	8.000					8.000
	Total						**11.000**
						Total Quantity in no	**11.000**
1.032	9.66.1						
	Providing and fixing ISI marked oxidised M.S. handles conforming to IS : 4992 with necessary screws etc. complete:125 mm						
	MS handle						
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.033	13.85.1						
	Applying priming coats with primer of approved brand and manufacture, having low VOC (Volatile Organic Compound) content.With ready mixed pink or grey primer on wood work (hard and soft wood) having VOC content less than 50 grams/ litre						
	priming coat on wood work						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Door	1.000	1.000		2.100	2.600000	5.460
	Window	1.000	1.500		1.500	1.600000	3.600
	Ventilator	4.000	0.900		0.600	1.600000	3.456
	Total						**12.516**
						Total Quantity in sqm	**12.516**
1.034	13.61.1						
	Painting with synthetic enamel paint of approved brand and manufacture to give an even shade:Two or more coats on new work						
	Enamel paint						
	Door	1.000	1.000		2.100	1.125000	2.363
	Window	1.000	1.500		1.500	0.500000	1.125
	Ventilator	4.000	0.900		0.600	0.500000	1.080
	Collapsible steel shutter	1.000	1.500		3.000	1.500000	6.750
	Total						**11.318**
						Total Quantity in sqm	**11.318**
1.035	13.52.1						
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work						
	Epoxy paint						
	Window	1.000	1.500		1.500	0.500000	1.125
	Ventilator	4.000	0.900		0.600	0.500000	1.080
	Courtyard	1.000	1.900		1.500	1.000000	2.850
		1.000	1.700		1.500	1.000000	2.550
	Door	1.000	1.500		2.100	1.000000	3.150
	Counter Room	1.000	2.900		1.100	1.000000	3.190
	Total						**13.945**
						Total Quantity in sqm	**13.945**
1.036	17.3.2						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.c. pan with ISI marked black solid plastic seat and lid						
	European type						
		4.000					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**
1.037	50.17.1.4						
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.						
	CP Health faucet						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.038	17.4.1						
	Providing and fixing white vitreous china flat back or wall corner type lipped front urinal basin of 430x260x350 mm and 340x410x265 mm sizes respectively with automatic flushing cistern with standard flush pipe and C.P. brass spreaders with brass unions and G.I. clamps complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required:One urinal basin with 5 litre white P.V.C. automatic flushing cistern						
	Urinal basin						
		4.000					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**
1.039	17.7.2						
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 630 x 450 mm with a single 15 mm C.P. brass pillar tap						
	Wash basin						
		6.000					6.000
	Total						**6.000**
						Total Quantity in each	**6.000**
1.040	18.48						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.						
	Tank						
		3000.000					3000.000
	Total						**3000.000**
						Total Quantity in Litre	**3000.000**
1.041	50.18.9.9.2						
	Providing and fixing PVC pipes includes joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in CHarge. 110 mm dia 4 Kg/cm2						
	pvc pipes						
		50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.042	50.18.9.7.2						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge.63 mm dia 4 Kgf/cm2						
	PVC Pipe 63mm						
		50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.043	50.18.7.4.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 10Kgf/cm2- Internal work - Exposed on wall						
	PVC PIPE 32MM						
		150.000					150.000
	Total						**150.000**
						Total Quantity in metre	**150.000**
1.044	50.18.8.3.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 25 mm pipe 10kgf /cm2						
	PVC PIPE 25MM						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		150.000					150.000
	Total						**150.000**
						Total Quantity in metre	**150.000**
1.045	50.18.9.20.3						
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 63 mm dia Door Elbow						
	Door Elbow						
		6.000					6.000
	Total						**6.000**
						Total Quantity in no	**6.000**
1.046	50.18.9.22.3						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement-110 mm dia Door Elbow						
	Door Elbow 110mm						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.047	50.18.9.22.4						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement- 110 mm dia Bend						
	110 mm Dia Bend						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.048	50.18.9.22.6						
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 110x110x110 mm dia Door tee						
	Door Tee						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.049	50.17.1.1						
	Supplying and fixing Stainless steel soap dish including cost of materials and labour charges etc complete as per the direction of site Engineer-in-charge.						
	Soap Dish						
		10.000					10.000
	Total						**10.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in no	**10.000**
1.050	50.17.1.3						
	Supplying and fixing CP Towel rod 60cm or nearest available length including cost of materials and labour charges etc complete as per the direction of site Engineer-in-charge.						
	Towel Rod						
		6.000					6.000
	Total						**6.000**
						Total Quantity in no	**6.000**
1.051	50.18.9.21.7						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Vent cowl						
	Vent cowl						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.052	18.58.1.1						
	Providing and fixing PTMT grating of approved quality and colour. Circular type100 mm nominal dia						
	PTMT grating						
		10.000					10.000
	Total						**10.000**
						Total Quantity in each	**10.000**
1.053	19.4.1.1						
	Providing and fixing square-mouth S.W. gully trap class SP -1 complete with C.I. grating brick masonry chamber with water tight C.I. cover with frame of 300x300 mm size (inside) the weight of cover to be not less than 4.50 kg and frame to be not less than 2.70 kg as per standard design: 100x100 mm size P typeWith common burnt clay F.P.S. (non modular) bricks of class designation 7.5						
	Gully Trap						
		4.000					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**
1.054	18.18.2						
	Providing and fixing ball valve (brass) of approved quality, High or low pressure, with plastic floats complete:20 mm nominal bore						
	Ball valve						
		5.000					5.000
	Total						**5.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in each	**5.000**
1.055	18.51.1						
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore						
	Long body bib cock						
		20.000					20.000
	Total						**20.000**
						Total Quantity in each	**20.000**
1.056	17.31						
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.						
	Mirror						
		2.000					2.000
	Total						**2.000**
						Total Quantity in each	**2.000**
1.057	10.3						
	Providing and fixing in position collapsible steel shutters with vertical channels 20x10x2 mm and braced with flat iron diagonals 20x5 mm size, with top and bottom rail of T-iron 40x40x6 mm, with 40 mm dia steel pulleys, complete with bolts, nuts,locking arrangement, stoppers, handles, including applying a priming coat of approved steel primer .						
	Collapsible steel shutter						
		1.000	1.500		3.000		4.500
	Total						**4.500**
						Total Quantity in sqm	**4.500**
1.058	19.7.1.2						
	Constructing brick masonry manhole in cement mortar 1:4 (1 cement : 4 coarse sand) with R.C.C. top with 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size), foundation concrete 1:4:8 mix (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size,) inside plastering 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with floating coat of neat cement and making channels in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement complete as per standard design: Inside size 90x80 cm and 45 cm deep including C.I. cover with frame (light duty) 455x610 mm internal dimensions, total weight of cover and frame to be not less than 38 kg (weigh of cover 23 kg and weight of frame 15 kg):With Sewer bricks conforming to IS : 4885						
	manhole						
	manhole	1.000					1.000
	Total						**1.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in each	**1.000**
1.059	19.33						
	Constructing soak pit 1.20x1.20 m filled with brickbats including S.W. drain pipe 100 mm diameter and 1.20 m long complete as per standard design.						
	soak pit						
	soak pit	3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.060	19.15.1						
	Providing M.S. foot rests including fixing in manholes with 20x20x10 cm cement concrete blocks 1:3:6 (1 cement : 3 coarse sand: 6 graded stone aggregate 20 mm nominal size) as per standard design.With 20x20 mm square bar						
	Foot rest						
	for manhole	1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
1.061	10.2						
	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.						
	steel work						
	Courtyard LS Qty 10kg/m2	1.000	1.900		1.500	10.000 000	28.500
	LS Qty 10kg/m2	1.000	1.700		1.500	10.000 000	25.500
	Door LS Qty 10kg/m2	1.000	1.500		2.100	10.000 000	31.500
	Counter Room LS Qty 10kg/m2	1.000	2.900		1.100	10.000 000	31.900
	Total						**117.400**
						Total Quantity in kg	**117.400**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District-Construction of Approach Road to Fishing Harbour-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Approach road**			
1.001	3.15			
	Scarifying the existing bituminous road surface to a depth of 50 mm and disposal of scarified material with in all lifts and lead upto 1000 metres by Mechanical Means			
	Net Total	3135.000sqm	@5.55/sqm	17399.25
1.002	2.2			
	Clearing grass and removal of rubbish up to a distance of 50 metres outside the periphery of the area			
	Net Total	0.095Hectare	@46902.97/Hectare	4455.78
1.003	2.1.1			
	Cutting of trees, including cutting of trunks, branches and removal of stumps, roots, stacking of serviceable material with all lifts and up to a lead of 1000 metres and earth filling in the depression/pit. Girth from 300 mm to 600 mm			
	Net Total	30.000each	@603.02/each	18090.60
1.004	4.1.A.2			
	Construction of granular sub-base by providing graded Material, mixing in a mechanical mix plant at OMC, carriage of mixed Material to work site, spreading in uniform layers with a motor grader on the prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per clause 401 Grading-II - Plant Mix Method			
	Net Total	826.500cum	@3280.48/cum	2711316.72
1.005	4.12			
	Providing, laying, spreading and compacting graded stone aggregate to Wet Mix Macadam specification including premixing the Material with water at OMC in mechanical mix plant carriage of mixed Material by tipper to site, laying in uniform layers with paver in sub- base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density.			
	Net Total	826.500cum	@3183.84/cum	2631443.76
1.006	5.1.a			
	Providing and applying primer coat with bitumen emulsion (SS) on prepared surface of granular Base including clearing of road surface and spraying primer at the rate of 0.70 - 1.0 kg/sqm using mechanical means.			
	Net Total	5225.000sqm	@57.98/sqm	302945.50
1.007	5.2.b			
	Providing and applying tack coat with bitumen emulsion (RS) using emulsion			

Sl No	Specification	Quantity	Rate	Amount
	pressure distributor at the rate of 0.25 - 0.30 kg per sqm on the prepared Granular Surface cleaned with mechanical broom.			
	Net Total	5225.000sqm	@13.05/sqm	68186.25
1.008	5.3.2.a			
	Providing and laying bituminous macadam with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading premixed with a bituminous binder (VG 30), transported to the site, laid over a previously prepared surface with paver finisher to the required grade, level, and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction For Grading II - (19 mm nominal size)			
	Net Total	261.250cum	@7787.76/cum	2034552.30
1.009	5.2.a			
	Providing and applying tack coat with bitumen emulsion(RS) using emulsion pressure distributor at the rate of 0.20 - 0.30 kg per sqm on the prepared bituminous surface cleaned with mechanical broom.			
	Net Total	5225.000sqm	@10.79/sqm	56377.75
1.010	5.6.2.a			
	Providing and laying bituminous concrete with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with a bituminous binder(NRMB) @ 5.4 percent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level, and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 507 complete in all respects For Grading - II (13.2 mm Nominal Size)			
	Net Total	156.750cum	@12465.77/cum	1954009.45
1.011	8.13			
	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads on Bituminous Surface @ 250 gms per sqm area, the thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35. The finished surface to be level, uniform, and free from streaks and holes.			
	Net Total	300.000sqm	@494.43/sqm	148329.00
1.012	8.35			
	Providing and fixing reflective road studs (Raised Pavement Marker) of ' category A' made out of ASA/HIPS/ABS moulded body with shanks and conforming to ASTM D 4280, strong enough to support a load of more than 13.635 T when tested in accordance with ASTM D 4280, reflective panel confirming to ASTM D 788, and reflectivity conforming to clause 804.4. including installation, drilling, fixing with adhesive etc. with 2 years warranty for the road stud as well as for in field performance as per clause 804.7.3 Road Markers/Road Stud with Lense Reflector :-			
	Net Total	720.000no	@195.85/no	141012.00
			Heading Total(Rs)	10088118.36
			Total Estimation PAC	

Sl No	Specification	Quantity	Rate	Amount
				10088118.36
Sl No	**Description**		**Percentage/LS**	**Amount**
2	**Lumsum Heading**			
2.001	Charges for Utility shifting - KSEB			
		0.00	0.00%	300000.00
2.002	Cost of Land Acquisition			
		0.00	0.00%	1000000.00
2.003	LS provision for part TS			
		0.00	0.00%	570000.00
			Total Lumsum Amount	1870000.00
3	**Extra Charges**			
2.001	Provision for GST			
		10088118.36	18.00%	1815861.30
			Grand Total	13773979.66
			Round off	26020.34
			Rounded Total(Rs)	13800000.00
	Rupees One Crore Thirty Eight Lakh			

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DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District-Construction of Approach Road to Fishing Harbour-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Approach road						
1.001	3.15						
	Scarifying the existing bituminous road surface to a depth of 50 mm and disposal of scarified material with in all lifts and lead upto 1000 metres by Mechanical Means						
	Existing village road 950m						
		1.000	950.000	3.300			3135.000
	Total						**3135.000**
						Total Quantity in sqm	**3135.000**
1.002	2.2						
	Clearing grass and removal of rubbish up to a distance of 50 metres outside the periphery of the area						
	for Approach Road						
		1.000	950.000	1.000		0.000100	0.095
	Total						**0.095**
						Total Quantity in Hectare	**0.095**
1.003	2.1.1						
	Cutting of trees, including cutting of trunks, branches and removal of stumps, roots, stacking of serviceable material with all lifts and up to a lead of 1000 metres and earth filling in the depression/pit. Girth from 300 mm to 600 mm						
	coconut trees						
		30.000					30.000
	Total						**30.000**
						Total Quantity in each	**30.000**
1.004	4.1.A.2						
	Construction of granular sub-base by providing graded Material, mixing in a mechanical mix plant at OMC, carriage of mixed Material to work site, spreading in uniform layers with a motor grader on the prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per clause 401 Grading-II - Plant Mix Method						
	Approach road						
		1.000	950.000	5.800	0.150		826.500
	Total						**826.500**
						Total Quantity in cum	**826.500**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.005	4.12						
	Providing, laying, spreading and compacting graded stone aggregate to Wet Mix Macadam specification including premixing the Material with water at OMC in mechanical mix plant carriage of mixed Material by tipper to site, laying in uniform layers with paver in sub- base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density.						
	for Approach Road						
		1.000	950.000	5.800	0.150		826.500
	Total						**826.500**
						Total Quantity in cum	**826.500**
1.006	5.1.a						
	Providing and applying primer coat with bitumen emulsion (SS) on prepared surface of granular Base including clearing of road surface and spraying primer at the rate of 0.70 - 1.0 kg/sqm using mechanical means.						
	for Approach Road						
		1.000	950.000	5.500			5225.000
	Total						**5225.000**
						Total Quantity in sqm	**5225.000**
1.007	5.2.b						
	Providing and applying tack coat with bitumen emulsion (RS) using emulsion pressure distributor at the rate of 0.25 - 0.30 kg per sqm on the prepared Granular Surface cleaned with mechanical broom.						
	for Approach Road						
		1.000	950.000	5.500			5225.000
	Total						**5225.000**
						Total Quantity in sqm	**5225.000**
1.008	5.3.2.a						
	Providing and laying bituminous macadam with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading premixed with a bituminous binder (VG 30), transported to the site, laid over a previously prepared surface with paver finisher to the required grade, level, and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction For Grading II - (19 mm nominal size)						
	for Approach Road-BM						
		1.000	950.000	5.500	0.050		261.250
	Total						**261.250**
						Total Quantity in cum	**261.250**
1.009	5.2.a						
	Providing and applying tack coat with bitumen emulsion(RS) using emulsion pressure distributor at the rate of 0.20 - 0.30 kg per sqm on the prepared bituminous surface cleaned with mechanical broom.						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for Approach Road						
		1.000	950.000	5.500			5225.000
	Total						**5225.000**
						Total Quantity in sqm	**5225.000**
1.010	5.6.2.a						
	Providing and laying bituminous concrete with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with a bituminous binder(NRMB) @ 5.4 percent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level, and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 507 complete in all respects For Grading - II (13.2 mm Nominal Size)						
	for Approach Road-BC						
		1.000	950.000	5.500	0.030		156.750
	Total						**156.750**
						Total Quantity in cum	**156.750**
1.011	8.13						
	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads on Bituminous Surface @ 250 gms per sqm area, the thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35. The finished surface to be level, uniform, and free from streaks and holes.						
	for Approach Road						
	ch0-950	2.000	950.000	0.150			285.000
	zebra crossing	10.000	2.500	0.500			12.500
	Rounding	1.000			2.500		2.500
	Total						**300.000**
						Total Quantity in sqm	**300.000**
1.012	8.35						
	Providing and fixing reflective road studs (Raised Pavement Marker) of ' category A' made out of ASA/HIPS/ABS moulded body with shanks and conforming to ASTM D 4280, strong enough to support a load of more than 13.635 T when tested in accordance with ASTM D 4280, reflective panel confirming to ASTM D 788, and reflectivity conforming to clause 804.4. including installation, drilling, fixing with adhesive etc. with 2 years warranty for the road stud as well as for in field performance as per clause 804.7.3 Road Markers/Road Stud with Lense Reflector :-						
	for Approach Road						
	both side	2.000	300.000				600.000
	for zebra crossing	10*12					120.000
	Total						**720.000**
						Total Quantity in no	**720.000**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasargod District- Construction of Work shop Building-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Civil work**			
1.001	2.8.1			
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil			
	Net Total	188.111cum	@291.42/cum	54819.31
1.002	50.2.3.1			
	Pumping or Bailing out water and removing slush etc by using pump set including cost of labour, oil hire charges of pumpset, etc complete			
	Net Total	50.000hour	@279.29/hour	13964.50
1.003	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	21.828cum	@6687.21/cum	145968.42
1.004	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	23.184cum	@7069.78/cum	163905.78
1.005	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	52.077cum	@9237.20/cum	481045.66
1.006	5.34.1			
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30			

Sl No	Specification	Quantity	Rate	Amount
	grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	85.538cum	@80.55/cum	6890.09
1.007	50.2.25.1			
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge			
	Net Total	28.981cum	@515.98/cum	14953.62
1.008	4.1.6			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)			
	Net Total	8.280cum	@7076.05/cum	58589.69
1.009	60.7.2			
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.			
	Net Total	4.969cum	@2557.65/cum	12708.96
1.010	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	33.461cum	@10858.36/cum	363331.58
1.011	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	145.100sqm	@329.03/sqm	47742.25
1.012	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	148.924sqm	@800.47/sqm	119209.19
1.013	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	145.770sqm	@637.63/sqm	92947.33

Sl No	Specification	Quantity	Rate	Amount
1.014	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	99.400sqm	@847.44/sqm	84235.54
1.015	OD5543/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR			
	Net Total	7013.440kilogram	@96.62/kilogram	677638.57
1.016	50.6.7.2			
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.			
	Net Total	68.406cum	@7872.96/cum	538557.70
1.017	21.1.1.1			
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)			
	Net Total	165.600kg	@489.70/kg	81094.32
1.018	21.3.2			
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 5.50 mm thickness			
	Net Total	12.640sqm	@1497.40/sqm	18927.14
1.019	9.116			
	Providing and fixing sliding arrangement in racks/ cupboards/cabinets shutter by with stainless steel rollers to run inside C or E aluminium channel section (The payment of C or E channel shall be made separately			
	Net Total	36.000no	@17.12/no	616.32
1.020	9.117.1			
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets			

Sl No	Specification	Quantity	Rate	Amount
	and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 48x40 mm			
	Net Total	15.600metre	@256.03/metre	3994.07
1.021	9.118.1			
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).			
	Net Total	5.400sqm	@2033.68/sqm	10981.87
1.022	9.53			
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	56.000each	@207.00/each	11592.00
1.023	9.97.5			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:100x10 mm			
	Net Total	3.000no	@67.14/no	201.42
1.024	50.9.15.1			
	Supplying and fixing 200 mm Aluminium aldrop			
	Net Total	3.000no	@171.51/no	514.53
1.025	10.6.1			
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	32.560sqm	@3400.57/sqm	110722.56
1.026	10.2			
	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.			
	Net Total	34.440kg	@117.55/kg	4048.42
1.027	50.18.9.22.8			
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement -110 mm dia Vent cowl			
	Net Total	1.000no	@123.09/no	123.09
1.028	50.18.7.4.2			
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall			
	Net Total	50.000metre	@295.71/metre	14785.50
1.029	50.18.7.6.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 10 Kfg/cm - Internal work- Exposed on wall			
	Net Total	40.000metre	@409.92/metre	16396.80
1.030	50.18.9.4.2			
	Providing and fixing PVC pipes includings joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 32 mm dia 6 Kgf/cm2			
	Net Total	40.000metre	@218.52/metre	8740.80
1.031	50.18.9.9.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2			
	Net Total	40.000metre	@521.14/metre	20845.60
1.032	50.18.9.13.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 25 mm dia 10 Kgf/cm2- External work - Exposed on wall			
	Net Total	50.000metre	@271.93/metre	13596.50
1.033	50.18.9.14.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm			

Sl No	Specification	Quantity	Rate	Amount
	dia 6 Kgf/cm2 - External work - Exposed on wall			
	Net Total	50.000metre	@305.29/metre	15264.50
1.034	50.18.9.18.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall			
	Net Total	50.000metre	@279.39/metre	13969.50
1.035	50.18.9.19.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/ clips/ at 1.00 m spacing . This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 mm dia 6 Kgf/cm2 - External work- Exposed on wall			
	Net Total	40.000metre	@379.40/metre	15176.00
1.036	13.1.1			
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	687.425sqm	@308.22/sqm	211878.13
1.037	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	82.800sqm	@262.57/sqm	21740.80
1.038	11.36			
	Providing and fixing I st quality ceramic glazed wall tiles conforming to IS : 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer -in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3 kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.			
	Net Total	8.150sqm	@1190.03/sqm	9698.74
1.039	11.41.2			
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.			
	Net Total	95.220sqm	@1733.20/sqm	165035.30
1.040	13.48.1			
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm			
	Net Total	762.075sqm	@164.22/sqm	125147.96
1.041	13.52.1			

Sl No	Specification	Quantity	Rate	Amount
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work			
	Net Total	106.072sqm	@219.17/sqm	23247.80
1.042	17.3.1			
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.C. pan with ISI marked white solid plastic seat and lid			
	Net Total	1.000each	@7721.48/each	7721.48
1.043	50.17.1.4			
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.			
	Net Total	1.000no	@758.07/no	758.07
1.044	17.7.3			
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 550x400 mm with a pair of 15 mm C.P. brass pillar taps			
	Net Total	3.000each	@3288.29/each	9864.87
1.045	18.51.1			
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore			
	Net Total	4.000each	@637.96/each	2551.84
1.046	18.52.1			
	Providing and fixing C.P brass stop cock (concealed) of standard design and of approved make conforming to IS: 893115 mm nominal bore			
	Net Total	5.000each	@700.27/each	3501.35
1.047	17.73.1			
	Providing and fixing PTMT towel rail complete with brackets fixed to wooden cleats with CP brass screws with concealed fitting arrangement of approved quality and colour450 mm long towel rail with total length of 495 mm, 78 mm wide and effective height of 88 mm. weighing not less than 170 gms			
	Net Total	2.000no	@641.43/no	1282.86
1.048	17.74			
	Providing and fixing PTMT shelf 440 mm long, 124 mm width and 36 mm height of approved quality and colour, weighing not less than 300 gms.			
	Net Total	1.000no	@741.89/no	741.89
1.049	18.65			

Sl No	Specification	Quantity	Rate	Amount
	Providing and fixing PTMT Soap Dish Holder having length of 138 mm, breadth 102 mm, height of 75 mm with concealed fittings arrangements, weighing not less than 106 gms.			
	Net Total	1.000each	@150.72/each	150.72
1.050	17.71			
	Providing and fixing PTMT liquid soap container 109 mm wide, 125 mm high and 112 mm distance from wall of standard shape with bracket of the same materials with snap fittings of approved quality and colour, weighing not less than 105 gms			
	Net Total	2.000each	@183.17/each	366.34
1.051	17.31			
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.			
	Net Total	1.000each	@1481.95/each	1481.95
1.052	18.48			
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.			
	Net Total	1000.000Litre	@10.18/Litre	10180.00
			Heading Total(Rs)	3833449.23
			Total Estimation PAC	3833449.23
Sl No	**Description**		**Percentage/LS**	**Amount**
2	**Lumsum Heading**			
2.001	LS Amount for Electrification			
		0.00	0.00%	150000.00
			Total Lumsum Amount	150000.00
3	**Extra Charges**			
2.001	Provision for GST			
		3833449.23	18.00%	690020.86
			Grand Total	4673470.09
			Round off	6529.91
			Rounded Total(Rs)	4680000.00
	Rupees Forty Six Lakh Eighty Thousand			

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasargod District- Construction of Work shop Building-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Civil work						
1.001	2.8.1						
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil						
	Earthwork						
	Footing 2.0x2.0	16.000	2.200	2.200	1.550		120.032
	Outer wall	2.000	10.050	0.800	0.750		12.060
		2.000	9.400	0.800	0.750		11.280
	Cross wall-rooms	2.000	6.000	0.800	0.750		7.200
		5.000	2.700	0.800	0.750		8.100
	Ramp	2.000	6.000	2.900	0.150		5.220
	Septic Tank	1.000	6.000	2.500	1.500		22.500
	Soak pit	1.000	1.250	1.250	1.100		1.719
	Total						**188.111**
						Total Quantity in cum	**188.111**
1.002	50.2.3.1						
	Pumping or Bailing out water and removing slush etc by using pump set including cost of labour, oil hire charges of pumpset, etc complete						
	Pumping						
	For footing	50.000					50.000
	Total						**50.000**
						Total Quantity in hour	**50.000**
1.003	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	PCC						
	Footing 2.0x2.0	16.000	2.200	2.200	0.150		11.616
	Outer wall	2.000	10.050	0.800	0.150		2.412
		2.000	9.400	0.800	0.150		2.256
	Cross wall-rooms	2.000	6.000	0.800	0.150		1.440

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		5.000	2.700	0.800	0.150		1.620
	Septic Tank	1.000	6.000	2.500	0.150		2.250
	Soak pit	1.000	1.250	1.250	0.150		0.234
	Total						**21.828**
						Total Quantity in cum	**21.828**
1.004	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	RR masonry						
	Outer wall	2.000	10.050	0.600	0.600		7.236
		2.000	9.400	0.600	0.600		6.768
	Cross wall-rooms	2.000	6.000	0.600	0.600		4.320
		5.000	2.700	0.600	0.600		4.860
	Total						**23.184**
						Total Quantity in cum	**23.184**
1.005	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	RCC- upto plinth level						
	Footing	16.000	2.000	2.000	0.200		12.800
		16.000	1/3	(2*2)+(0.5*0.5)+(2*0.5)	0.200		5.600
	Footing pedestal	0.950	0.500	0.500	1.000		0.238
	Plinth beam	2.000	10.050	0.450	0.450		4.070
	Short wall	2.000	9.400	0.450	0.450		3.807
	Cross wall-rooms	2.000	6.000	0.450	0.450		2.430
		5.000	2.700	0.450	0.450		2.734
	Ramp	2.000	6.000	2.900	(0.60+0.15)/2		13.050
	Soak pit	1.000	4*1.25	0.200	1.000		1.000
	Septic Tank -bed slab	1.000	6.000	2.500	0.150		2.250

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Septic Tank -side wall	2.000	2.100	0.200	1.100		0.924
	Septic Tank -side wall	2.000	0.600	0.200	1.100		0.264
	Septic Tank - baffle wall	2.000	2.100	0.150	0.800		0.504
	Septic Tank - cover slab	1.000	6.000	2.500	0.150		2.250
	Soak pit -cover slab	1.000	1.250	1.250	0.100		0.156
	Total						**52.077**
						Total Quantity in cum	**52.077**
1.006	5.34.1						
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	RCC- upto plinth level						
	Footing	16.000	2.000	2.000	0.200		12.800
		16.000	1/3	(2*2)+(0.5*0.5)+(2*0.5)	0.200		5.600
	Footing pedestal	0.950	0.500	0.500	1.000		0.238
	Plinth beam	2.000	10.050	0.450	0.450		4.070
	Short wall	2.000	9.400	0.450	0.450		3.807
	Cross wall-rooms	2.000	6.000	0.450	0.450		2.430
		5.000	2.700	0.450	0.450		2.734
	Ramp	2.000	6.000	2.900	(0.60+0.15)/2		13.050
	Soak pit	1.000	4*1.25	0.200	1.000		1.000
	Septic Tank -bed slab	1.000	6.000	2.500	0.150		2.250
	Septic Tank -side wall	2.000	2.100	0.200	1.100		0.924
	Septic Tank -side wall	2.000	0.600	0.200	1.100		0.264
	Septic Tank - baffle wall	2.000	2.100	0.150	0.800		0.504
	Septic Tank - cover slab	1.000	6.000	2.500	0.150		2.250
	Soak pit -cover slab	1.000	1.250	1.250	0.100		0.156
	Total						**52.077**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Lintel						
	Outer wall	4.000	9.800	0.200	0.150		1.176
	Cross wall-rooms	2.000	6.000	0.200	0.150		0.360
		5.000	2.700	0.200	0.150		0.405
	Total						**1.941**
	Beam						
	longitudinal	12.000	2.900	0.300	0.350		3.654
	transverse	12.000	2.800	0.300	0.350		3.528
	Total						**7.182**
	Roof slab						
	Roof slab	1.000	10.400	10.400	0.120		12.979
	Deduct crane room	-1.000	3.000	3.000	0.120		-1.080
	crane room slab	1.000	4.000	4.000	0.120		1.920
	Total						**13.819**
	Sunshade						
	Outer wall	4.000	9.800	0.600	(0.1+0.07)/2		1.999
	Total						**1.999**
	Columns						
	Columns	12.000	0.300	0.400	4.100		5.904
	Columns for crane room	4.000	0.300	0.400	5.450		2.616
	Total						**8.520**
						Total Quantity in cum	**85.538**
1.007	50.2.25.1						
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge						
	Filling						
	shop & workshop rooms	3.000	3.000	3.000	0.350		9.450
	office room	1.000	1.750	3.000	0.350		1.838
	workspace	1.000	3.000	9.400	0.350		9.870
	toilet	1.000	1.050	1.200	0.350		0.441
	passage+ crane facility	1.000	6.400	3.000	0.350		6.720
	passage to w/c	1.000	1.050	1.800	0.350		0.662
	Total						**28.981**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**28.981**
1.008	4.1.6						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)						
	CC Flooring						
	shop & workshop rooms	3.000	3.000	3.000	0.100		2.700
	office room	1.000	1.750	3.000	0.100		0.525
	workspace	1.000	3.000	9.400	0.100		2.820
	toilet	1.000	1.050	1.200	0.100		0.126
	passage+ crane facility	1.000	6.400	3.000	0.100		1.920
	passage to w/c	1.000	1.050	1.800	0.100		0.189
	Total						**8.280**
						Total Quantity in cum	**8.280**
1.009	60.7.2						
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.						
	DR packing						
	Septic tank	1.000	6.000	2.500	0.300		4.500
	Soak pit	1.000	1.250	1.250	0.300		0.469
	Total						**4.969**
						Total Quantity in cum	**4.969**
1.010	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	Lintel						
	Outer wall	4.000	9.800	0.200	0.150		1.176
	Cross wall-rooms	2.000	6.000	0.200	0.150		0.360
		5.000	2.700	0.200	0.150		0.405
	Total						**1.941**
	Beam						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	longitudinal	12.000	2.900	0.300	0.350		3.654
	transverse	12.000	2.800	0.300	0.350		3.528
	Total						**7.182**
	Roof slab						
	Roof slab	1.000	10.400	10.400	0.120		12.979
	Deduct crane room	-1.000	3.000	3.000	0.120		-1.080
	crane room slab	1.000	4.000	4.000	0.120		1.920
	Total						**13.819**
	Sunshade						
	Outer wall	4.000	9.800	0.600	(0.1+0.07)/2		1.999
	Total						**1.999**
	Columns						
	Columns	12.000	0.300	0.400	4.100		5.904
	Columns for crane room	4.000	0.300	0.400	5.450		2.616
	Total						**8.520**
						Total Quantity in cum	**33.461**
1.011	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	Footing & foundations						
	Footing PCC	4*16	2.200		0.150		21.120
	Footing RCC	4*16	2.000		0.200		25.600
	Pedestal	4*16	0.500		1.000		32.000
	Septic Tank-bed slab	1.000	6+2.5		0.150		1.275
	Soak pit-bed slab	1.000	1.250+1.250		0.150		0.375
	Septic Tank -side wall	2*2	2.1+6		1.100		35.640
	Septic Tank - baffle wall	2*2	2.100		0.800		6.720
	Septic Tank - cover slab	2.000	6+2.5		0.150		2.550
	Soak pit -cover slab	4.000	1.250		0.100		0.500
	Outer wall	2*2.000	10.050		0.150		6.030

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		2*2.000	9.400		0.150		5.640
	Cross wall-rooms	2*2.000	6.000		0.150		3.600
		2*5.000	2.700		0.150		4.050
	Total						**145.100**
						Total Quantity in sqm	**145.100**
1.012	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Slabs						
	Roof slab	1.000	10.400	10.400			108.160
		4.000	10.400		0.120		4.992
	Deduct crane room	-1.000	3.000	3.000			-9.000
	crane room slab	1.000	4.000	4.000			16.000
		4.000	4.000		0.120		1.920
	Total						**122.072**
	Sunshade						
	sunshade	4.000	9.800	0.600			23.520
		4.000	9.800		(0.1+0.07)/2		3.332
	Total						**26.852**
						Total Quantity in sqm	**148.924**
1.013	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	Plinth beam						
	Outer wall	2*2.000	10.050		0.450		18.090
		2*2.000	9.400		0.450		16.920
	Cross wall-rooms	2*2.000	6.000		0.450		10.800
		2*5.000	2.700		0.450		12.150
	Total						**57.960**
	Lintel						
	Outer wall	2*4.000	9.800		0.150		11.760

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Cross wall-rooms	2*2.000	6.000		0.150		3.600
		2*5.000	2.700		0.150		4.050
	Total						**19.410**
	Beams						
	longitudinal	12.000	2.900	0.300			10.440
	longitudinal	2*12.000	2.900		0.350		24.360
	transverse	12.000	2.800	0.300			10.080
	transverse	2*12.000	2.800		0.350		23.520
	Total						**68.400**
						Total Quantity in sqm	**145.770**
1.014	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	Columns						
	Columns	12.000	(0.300+0.4)*2		4.100		68.880
	Columns for crane room	4.000	(0.300+0.4)*2		5.450		30.520
	Total						**99.400**
						Total Quantity in sqm	**99.400**
1.015	OD5543/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR						
	Steel						
	LS Qty-80kg/m3 For item no.5	52.077				80.000000	4166.160
	For item no.10	8.520				100.000000	852.000
	For item no.10	24.941				80.000000	1995.280
	Total						**7013.440**
						Total Quantity in kilogram	**7013.440**
1.016	50.6.7.2						
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.						
	Laterite masonry						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Outer wall	2.000	10.050	0.200	4.100		16.482
		1.000	9.400	0.200	4.100		7.708
	Cross wall-rooms	2.000	6.000	0.200	4.100		9.840
		5.000	2.700	0.200	4.100		11.070
	additional height for crane room	1.000	9.000	0.200	5.45-4.100		2.430
	Parapet wall	4.000	10.100		0.800		32.320
	deductions- RS1	-2.000	1.500	0.200	3.700		-2.220
	deductions- RS2	-2.000	2.900	0.200	3.700		-4.292
	deductions- Door D	-2.000	1.100	0.200	2.100		-0.924
	deductions- Door D1	-1.000	0.800	0.200	2.100		-0.336
	deductions- Window W	-6.000	1.500	0.200	1.500		-2.700
	deductions- Window W1	-3.000	1.000	0.200	1.500		-0.900
	deductions- Ventilator V	-1.000	0.600	0.200	0.600		-0.072
	Total						**68.406**
						Total Quantity in cum	**68.406**
1.017	21.1.1.1						
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)						
	Aluminium window						
	Window frame, W	6.000	4*(1.5+.8)			2.000000	110.400
	Window frame, W1	3.000	4*(1.5+.6)			2.000000	50.400
	ventilator V	1.000	4*0.600			2.000000	4.800
	Total						**165.600**
						Total Quantity in kg	**165.600**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.018	21.3.2						
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 5.50 mm thickness						
	Glazing						
	Window W	2*6	1.300	0.600			9.360
	Window W1	2*3	1.300	0.400			3.120
	ventilator V	1.000	0.400	0.400			0.160
	Total						**12.640**
						Total Quantity in sqm	**12.640**
1.019	9.116						
	Providing and fixing sliding arrangement in racks/ cupboards/cabinets shutter by with stainless steel rollers to run inside C or E aluminium channel section (The payment of C or E channel shall be made separately						
	Sliding arrangement						
	Windows	4*9					36.000
	Total						**36.000**
						Total Quantity in no	**36.000**
1.020	9.117.1						
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 48x40 mm						
	frame						
	Door D	2*2	2.100				8.400
	Door D	1*2	1.100				2.200
	Door D1	2*1.000	2.100				4.200
	Door D1	1.000	0.800				0.800
	Total						**15.600**
						Total Quantity in metre	**15.600**
1.021	9.118.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).						
	Shutter						
	D	2.000	1.000		2.000		4.000
	D1	1.000	0.700		2.000		1.400
	Total						**5.400**
						Total Quantity in sqm	**5.400**
1.022	9.53						
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	Hold fast						
	Door	3*6				1.000000	18.000
	Window	9*4				1.000000	36.000
	V	1*2				1.000000	2.000
	Total						**56.000**
						Total Quantity in each	**56.000**
1.023	9.97.5						
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:100x10 mm						
	Tower bolt						
	Doors	3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.024	50.9.15.1						
	Supplying and fixing 200 mm Aluminium aldrop						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Aluminium aldrop						
	For doors	3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.025	10.6.1						
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover						
	Rolling shutter						
	RS1	2.000	1.500		3.700		11.100
	RS2	2.000	2.900		3.700		21.460
	Total						**32.560**
						Total Quantity in sqm	**32.560**
1.026	10.2						
	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.						
	Grill						
	LS Qty 10kg/m2	3.000	2.800		4.100		34.440
	Total						**34.440**
						Total Quantity in kg	**34.440**
1.027	50.18.9.22.8						
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement -110 mm dia Vent cowl						
	Vent cowl						
	For toilet	1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.028	50.18.7.4.2						
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall						
	PVC Pipe						
	32mm	50.000					50.000
	Total						**50.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in metre	**50.000**
1.029	50.18.7.6.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 10 Kfg/cm - Internal work- Exposed on wall						
	PVC Pipe						
	50mm	40.000					40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.030	50.18.9.4.2						
	Providing and fixing PVC pipes includings joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 32 mm dia 6 Kgf/cm2						
	PVC Pipe						
	32mm	40.000					40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.031	50.18.9.9.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2						
	PVC Pipe						
	110mm	40.000					40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.032	50.18.9.13.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 25 mm dia 10 Kgf/cm2- External work - Exposed on wall						
	PVC Pipe						
	25mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.033	50.18.9.14.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - External work - Exposed on wall						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	PVC Pipe						
	32mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.034	50.18.9.18.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall						
	PVC Pipe						
	75mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.035	50.18.9.19.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/ clips/ at 1.00 m spacing . This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 mm dia 6 Kgf/cm2 - External work- Exposed on wall						
	PVC Pipe						
	110mm	40.000					40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.036	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	Plastering						
	Outer wall	2*2.000	10.050		4.100		164.820
		2*1.000	9.400		4.100		77.080
	Cross wall-rooms	2*2.000	6.000		4.100		98.400
		2*5.000	2.700		4.100		110.700
	additional height for crane room	2*1.000	9.000		5.45-4.100		24.300
	Parapet wall	2*4.000	10.100		0.800+.8+.10		137.360
	Sunshade	2*4.000	9.800	0.600			47.040
	Plinth beam	2.000	10.050		0.450		9.045
		2.000	9.400		0.450		8.460

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	LS for beam and column projections	100.000					100.000
	deductions- RS1	-2*2.000	1.500		3.700		-22.200
	deductions- RS2	-2*2.000	2.900		3.700		-42.920
	deductions- Door D	-2.000	1.100		2.100		-4.620
	deductions- Door D1	-1.000	0.800		2.100		-1.680
	deductions- Window W	-6.000	1.500		1.500		-13.500
	deductions- Window W1	-3.000	1.000		1.500		-4.500
	deductions- Ventilator V	-1.000	0.600		0.600		-0.360
	Total						**687.425**
						Total Quantity in sqm	**687.425**
1.037	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	Ceiling plastering						
	shop & workshop rooms	3.000	3.000	3.000			27.000
	office room	1.000	1.750	3.000			5.250
	workspace	1.000	3.000	9.400			28.200
	toilet	1.000	1.050	1.200			1.260
	passage+ crane facility	1.000	6.400	3.000			19.200
	passage to w/c	1.000	1.050	1.800			1.890
	Total						**82.800**
						Total Quantity in sqm	**82.800**
1.038	11.36						
	Providing and fixing I st quality ceramic glazed wall tiles conforming to IS : 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer -in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3 kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.						
	Wall tiles						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	w/c	1.000	2*(1.05+ 1.2)		1.500		6.750
	Wash area	1.000	2.000		0.700		1.400
	Total						**8.150**
						Total Quantity in sqm	**8.150**
1.039	11.41.2						
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.						
	Floor Tile						
	shop & workshop rooms	3.000	3.000	3.000			27.000
	office room	1.000	1.750	3.000			5.250
	workspace	1.000	3.000	9.400			28.200
	toilet	1.000	1.050	1.200			1.260
	passage+ crane facility	1.000	6.400	3.000			19.200
	passage to w/c	1.000	1.050	1.800			1.890
	For Skirting - 15% of floor area	82.800				0.150000	12.420
	Total						**95.220**
						Total Quantity in sqm	**95.220**
1.040	13.48.1						
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm						
	Painting						
	ceiling- shop & workshop rooms	3.000	3.000	3.000			27.000
	office room	1.000	1.750	3.000			5.250
	workspace	1.000	3.000	9.400			28.200
	toilet	1.000	1.050	1.200			1.260
	passage+ crane facility	1.000	6.400	3.000			19.200
	passage to w/c	1.000	1.050	1.800			1.890
	Outer wall	2*2.000	10.050		4.100		164.820
		2*1.000	9.400		4.100		77.080

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Cross wall-rooms	2*2.000	6.000		4.100		98.400
		2*5.000	2.700		4.100		110.700
	additional height for crane room	2*1.000	9.000		5.45-4.100		24.300
	Parapet wall	2*4.000	10.100		0.800+.8+.10		137.360
	Sunshade	2*4.000	9.800	0.600			47.040
	Plinth beam	2.000	10.050		0.450		9.045
		2.000	9.400		0.450		8.460
	LS for beam and column projections	100.000					100.000
	deductions- RS1	-2*2.000	1.500		3.700		-22.200
	deductions- RS2	-2*2.000	2.900		3.700		-42.920
	deductions- Door D	-2.000	1.100		2.100		-4.620
	deductions- Door D1	-1.000	0.800		2.100		-1.680
	deductions- Window W	-6.000	1.500		1.500		-13.500
	deductions- Window W1	-3.000	1.000		1.500		-4.500
	deductions- Ventilator V	-1.000	0.600		0.600		-0.360
	deductions-wall tile w/c	-1.000	2*(1.05+1.2)		1.500		-6.750
	deductions-Wash area	-1.000	2.000		0.700		-1.400
	Total						**762.075**
						Total Quantity in sqm	**762.075**
1.041	13.52.1						
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work						
	Epoxy paint						
	RS1	2*2.000	1.500		3.700	1.100000	24.420

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	RS2	2*2.000	2.900		3.700	1.100000	47.212
	Grill	3.000	2.800		4.100	1.000000	34.440
	Total						**106.072**
						Total Quantity in sqm	**106.072**
1.042	17.3.1						
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.C. pan with ISI marked white solid plastic seat and lid						
	WC						
	Water Closet	1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
1.043	50.17.1.4						
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.						
	Health Faucet						
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.044	17.7.3						
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 550x400 mm with a pair of 15 mm C.P. brass pillar taps						
	Wash basin						
	Wash basin	3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.045	18.51.1						
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore						
	Bib cock						
	Bib cock	4.000					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.046	18.52.1						
	Providing and fixing C.P brass stop cock (concealed) of standard design and of approved make conforming to IS: 893115 mm nominal bore						
	Stop cock						
	For Health faucet and water closet	2.000					2.000
	For wash basin	3.000					3.000
	Total						**5.000**
						Total Quantity in each	**5.000**
1.047	17.73.1						
	Providing and fixing PTMT towel rail complete with brackets fixed to wooden cleats with CP brass screws with concealed fitting arrangement of approved quality and colour450 mm long towel rail with total length of 495 mm, 78 mm wide and effective height of 88 mm. weighing not less than 170 gms						
	Towel rail						
	For w/c & wash area	2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.048	17.74						
	Providing and fixing PTMT shelf 440 mm long, 124 mm width and 36 mm height of approved quality and colour, weighing not less than 300 gms.						
	PTMT Shelf						
	For Toilet	1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.049	18.65						
	Providing and fixing PTMT Soap Dish Holder having length of 138 mm, breadth 102 mm, height of 75 mm with concealed fittings arrangements, weighing not less than 106 gms.						
	Soap dish						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
1.050	17.71						
	Providing and fixing PTMT liquid soap container 109 mm wide, 125 mm high and 112 mm distance from wall of standard shape with bracket of the same materials with snap fittings of approved quality and colour, weighing not less than 105 gms						
	Fixing liquid soap container						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	liquid soap container	2.000					2.000
	Total						**2.000**
						Total Quantity in each	**2.000**
1.051	17.31						
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.						
	Fixing mirror						
	mirror	1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
1.052	18.48						
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.						
	Water tank						
	Water tank	1.000	1000.000				1000.000
	Total						**1000.000**
						Total Quantity in Litre	**1000.000**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of office room cum harbour surveillance camera room-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Civil work**			
1.001	2.8.1			
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil			
	Net Total	293.071cum	@291.42/cum	85406.75
1.002	50.2.3.1			
	Pumping or Bailing out water and removing slush etc by using pump set including cost of labour, oil hire charges of pumpset, etc complete			
	Net Total	50.000hour	@279.29/hour	13964.50
1.003	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	36.210cum	@6687.21/cum	242143.87
1.004	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	43.200cum	@7069.78/cum	305414.50
1.005	50.2.25.1			
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge			
	Net Total	118.566cum	@515.98/cum	61177.68
1.006	4.1.6			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)			
	Net Total	26.348cum	@7076.05/cum	186439.77
1.007	60.7.2			

Sl No	Specification	Quantity	Rate	Amount
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.			
	Net Total	4.969cum	@2557.65/cum	12708.96
1.008	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	71.603cum	@9237.20/cum	661411.23
1.009	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	90.338cum	@10858.36/cum	980922.53
1.010	5.34.1			
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	161.941cum	@80.55/cum	13044.35
1.011	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	235.330sqm	@329.03/sqm	77430.63
1.012	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	466.424sqm	@800.47/sqm	373358.42
1.013	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	342.073sqm	@637.63/sqm	218116.01

Sl No	Specification	Quantity	Rate	Amount
1.014	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	171.640sqm	@847.44/sqm	145454.60
1.015	5.9.7			
	Centering and shuttering including strutting, etc. and removal of form for:Stairs, (excluding landings) except spiral - staircases)			
	Net Total	5.445sqm	@718.82/sqm	3913.97
1.016	OD5511/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR			
	Net Total	12987.040kilogram	@96.62/kilogram	1254807.80
1.017	50.6.7.2			
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.			
	Net Total	89.888cum	@7872.96/cum	707684.63
1.018	21.1.1.1			
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)			
	Net Total	539.600kg	@489.70/kg	264242.12
1.019	21.2.2			
	Providing and fixing 12 mm thick prelaminated particle board flat pressed three layer or graded wood particle board conforming to IS : 12823 Grade I Type II, in panelling fixed in aluminum doors, windows shutters and partition frames with C.P. brass / stainless steel screws etc. complete as per architectural drawings and directions of Engineer - in- Charge.Pre- laminated particle board with decorative lamination on both sides			
	Net Total	5.400sqm	@1209.19/sqm	6529.63
1.020	21.3.2			
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of			

Sl No	Specification	Quantity	Rate	Amount
	aluminium snap beading shall be paid in basic item):With float glass panes of 5.50 mm thickness			
	Net Total	60.400sqm	@1497.40/sqm	90442.96
1.021	9.116			
	Providing and fixing sliding arrangement in racks/ cupboards/cabinets shutter by with stainless steel rollers to run inside C or E aluminium channel section (The payment of C or E channel shall be made separately			
	Net Total	48.000no	@17.12/no	821.76
1.022	9.117.1			
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 48x40 mm			
	Net Total	15.000metre	@256.03/metre	3840.45
1.023	9.118.1			
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).			
	Net Total	4.800sqm	@2033.68/sqm	9761.66
1.024	9.53			
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	96.000each	@207.00/each	19872.00
1.025	9.97.5			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:100x10 mm			
	Net Total	12.000no	@67.14/no	805.68

Sl No	Specification	Quantity	Rate	Amount
1.026	9.88			
	Providing and fixing chromium plated brass 100 mm mortice latch and lock with 6 levers and a pair of lever handles of approved quality with necessary screws etc. complete.			
	Net Total	7.000no	@931.47/no	6520.29
1.027	50.9.15.1			
	Supplying and fixing 200 mm Aluminium aldrop			
	Net Total	3.000no	@171.51/no	514.53
1.028	10.6.1			
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover			
	Net Total	23.385sqm	@3400.57/sqm	79522.33
1.029	50.18.9.22.8			
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement -110 mm dia Vent cowl			
	Net Total	3.000no	@123.09/no	369.27
1.030	50.18.7.4.2			
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall			
	Net Total	60.000metre	@295.71/metre	17742.60
1.031	50.18.7.6.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 10 Kfg/cm - Internal work- Exposed on wall			
	Net Total	50.000metre	@409.92/metre	20496.00
1.032	50.18.9.4.2			
	Providing and fixing PVC pipes includings joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 32 mm dia 6 Kgf/cm2			
	Net Total	50.000metre	@218.52/metre	10926.00
1.033	50.18.9.9.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	50.000metre	@521.14/metre	26057.00
1.034	50.18.9.13.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 25 mm dia 10 Kgf/cm2- External work - Exposed on wall			
	Net Total	50.000metre	@271.93/metre	13596.50
1.035	50.18.9.14.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - External work - Exposed on wall			
	Net Total	50.000metre	@305.29/metre	15264.50
1.036	50.18.9.18.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall			
	Net Total	50.000metre	@279.39/metre	13969.50
1.037	50.18.9.19.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/ clips/ at 1.00 m spacing . This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 mm dia 6 Kgf/cm2 - External work- Exposed on wall			
	Net Total	40.000metre	@379.40/metre	15176.00
1.038	13.1.1			
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	1063.447sqm	@308.22/sqm	327775.63
1.039	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	551.830sqm	@262.57/sqm	144894.00
1.040	11.36			
	Providing and fixing I st quality ceramic glazed wall tiles conforming to IS : 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer -in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3 kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.			
	Net Total	25.700sqm	@1190.03/sqm	30583.77
1.041	11.41.2			
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS :			

Sl No	Specification	Quantity	Rate	Amount
	15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.			
	Net Total	361.322sqm	@1733.20/sqm	626243.29
1.042	13.47.1			
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)			
	Net Total	553.507sqm	@186.15/sqm	103035.33
1.043	13.48.1			
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm			
	Net Total	1036.070sqm	@164.22/sqm	170143.42
1.044	13.52.1			
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work			
	Net Total	51.447sqm	@219.17/sqm	11275.64
1.045	10.28			
	Providing and fixing stainless steel (Grade 304) railing made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners, stainless steel bolts etc., of required size on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.)			
	Net Total	77.480kg	@664.68/kg	51499.41
1.046	17.3.1			
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.C. pan with ISI marked white solid plastic seat and lid			
	Net Total	3.000each	@7721.48/each	23164.44
1.047	50.17.1.4			
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.			
	Net Total	3.000no	@758.07/no	2274.21
1.048	17.7.3			

Sl No	Specification	Quantity	Rate	Amount
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 550x400 mm with a pair of 15 mm C.P. brass pillar taps			
	Net Total	3.000each	@3288.29/each	9864.87
1.049	18.51.1			
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore			
	Net Total	6.000each	@637.96/each	3827.76
1.050	18.52.1			
	Providing and fixing C.P brass stop cock (concealed) of standard design and of approved make conforming to IS: 893115 mm nominal bore			
	Net Total	9.000each	@700.27/each	6302.43
1.051	17.73.1			
	Providing and fixing PTMT towel rail complete with brackets fixed to wooden cleats with CP brass screws with concealed fitting arrangement of approved quality and colour450 mm long towel rail with total length of 495 mm, 78 mm wide and effective height of 88 mm. weighing not less than 170 gms			
	Net Total	2.000no	@641.43/no	1282.86
1.052	21.12.2			
	Providing and fixing aluminium tubular handle bar 32 mm outer dia, 3.0mm thick & 2100 mm long with S.S. screws etc. complete as per direction of Engineer -in-Charge.Powder coated minimum thickness 50 micron aluminium tubular handle bar			
	Net Total	14.000no	@649.84/no	9097.76
1.053	17.74			
	Providing and fixing PTMT shelf 440 mm long, 124 mm width and 36 mm height of approved quality and colour, weighing not less than 300 gms.			
	Net Total	3.000no	@741.89/no	2225.67
1.054	18.65			
	Providing and fixing PTMT Soap Dish Holder having length of 138 mm, breadth 102 mm, height of 75 mm with concealed fittings arrangements, weighing not less than 106 gms.			
	Net Total	4.000each	@150.72/each	602.88
1.055	17.71			
	Providing and fixing PTMT liquid soap container 109 mm wide, 125 mm high and 112 mm distance from wall of standard shape with bracket of the same materials with snap fittings of approved quality and colour, weighing not less than 105 gms			
	Net Total	2.000each	@183.17/each	366.34
1.056	17.10.1.2			
	Providing and fixing Stainless Steel A ISI 304 (18/8) kitchen sink as per IS 13983 with C.I. brackets and stainless steel plug 40 mm, including painting of fittings and brackets, cutting and making good the walls wherever required:			

Sl No	Specification	Quantity	Rate	Amount
	Kitchen sink with drain board510x 1040 mm bowl depth 225 mm			
	Net Total	1.000each	@6758.95/each	6758.95
1.057	17.31			
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.			
	Net Total	2.000each	@1481.95/each	2963.90
1.058	18.48			
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.			
	Net Total	1000.000Litre	@10.18/Litre	10180.00
1.059	8.2.2.2			
	Providing and fixing 18 mm thick gang saw cut, mirror, polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations, of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.Area of slab over 0.50 sqm			
	Net Total	0.700sqm	@4629.02/sqm	3240.31
1.060	16.21			
	Engraving letters in hard stone			
	Net Total	400.000per Letter per cm height	@9.46/per Letter per cm height	3784.00
1.061	13.71			
	Lettering with black Japan pint of approved brand and manufacture			
	Net Total	600.000per Letter per cm height	@5.47/per Letter per cm height	3282.00
			Heading Total(Rs)	7514539.85
			Total Estimation PAC	7514539.85
3	**Extra Charges**			
2.001	Provision for GST			
		7514539.85	18.00%	1352617.17
			Grand Total	8867157.02
			Round off	32842.98
			Rounded Total(Rs)	8900000.00
	Rupees Eighty Nine Lakh			

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of office room cum harbour surveillance camera room-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Civil work						
1.001	2.8.1						
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil						
	Earth work						
	Footing 2.0x2.0	26.000	2.200	2.200	1.550		195.052
	Long wall	3.000	21.500	0.800	0.750		38.700
	Short wall	3.000	13.000	0.800	0.750		23.400
	Cross wall-rooms	3.000	4.000	0.800	0.750		7.200
	Toilet	3.000	1.500	0.800	0.750		2.700
	Step	1.000	5.000	0.600	0.150		0.450
	Ramp	1.000	6.000	1.500	0.150		1.350
	Septic Tank	1.000	6.000	2.500	1.500		22.500
	Soak pit	1.000	1.250	1.250	1.100		1.719
	Total						**293.071**
						Total Quantity in cum	**293.071**
1.002	50.2.3.1						
	Pumping or Bailing out water and removing slush etc by using pump set including cost of labour, oil hire charges of pumpset, etc complete						
	Pumping						
	For footing	50.000					50.000
	Total						**50.000**
						Total Quantity in hour	**50.000**
1.003	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	PCC						
	Footing 2.0x2.0	26.000	2.200	2.200	0.150		18.876
	Long wall	3.000	21.500	0.800	0.150		7.740

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Short wall	3.000	13.000	0.800	0.150		4.680
	Cross wall-rooms	3.000	4.000	0.800	0.150		1.440
	Toilet	3.000	1.500	0.800	0.150		0.540
	Step	1.000	5.000	0.600	0.150		0.450
	Septic Tank	1.000	6.000	2.500	0.150		2.250
	Soak pit	1.000	1.250	1.250	0.150		0.234
	Total						**36.210**
						Total Quantity in cum	**36.210**
1.004	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	RR masonry						
	Long wall	3.000	21.500	0.600	0.600		23.220
	Short wall	3.000	13.000	0.600	0.600		14.040
	Cross wall-rooms	3.000	4.000	0.600	0.600		4.320
	Toilet	3.000	1.500	0.600	0.600		1.620
	Total						**43.200**
						Total Quantity in cum	**43.200**
1.005	50.2.25.1						
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge						
	Filling						
	Entrance and stair room	1.000	13.000	3.600	0.450		21.060
	office room	1.000	4.000	6.000	0.450		10.800
	store room	1.000	4.000	4.000	0.450		7.200
	rest room	1.000	4.000	4.000	0.450		7.200
	toilet	2.000	1.500	1.200	0.450		1.620
	wash area	1.000	2.200	2.600	0.450		2.574
	cabin side	1.000	8.800	17.200	0.450		68.112
	Total						**118.566**
						Total Quantity in cum	**118.566**
1.006	4.1.6						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	CC Flooring						
	Entrance and stair room	1.000	13.000	3.600	0.100		4.680
	office room	1.000	4.000	6.000	0.100		2.400
	store room	1.000	4.000	4.000	0.100		1.600
	rest room	1.000	4.000	4.000	0.100		1.600
	toilet	2.000	1.500	1.200	0.100		0.360
	wash area	1.000	2.200	2.600	0.100		0.572
	cabin side	1.000	8.800	17.200	0.100		15.136
	Total						**26.348**
						Total Quantity in cum	**26.348**
1.007	60.7.2						
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.						
	DR packing						
	Septic tank	1.000	6.000	2.500	0.300		4.500
	Soak pit	1.000	1.250	1.250	0.300		0.469
	Total						**4.969**
						Total Quantity in cum	**4.969**
1.008	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	RCC- upto plinth level						
	Footing	26.000	2.000	2.000	0.200		20.800
		26.000	1/3	(2*2)+(0.5*0.5)+(2*0.5)	0.200		9.100
	Footing pedestal	26.000	0.500	0.500	1.000		6.500
	Stair bottom slab	1.000	1.500	1.000	0.120		0.180
	Plinth beam-Long wall	3.000	21.500	0.450	0.450		13.061
	Short wall	3.000	13.000	0.450	0.450		7.898
	Cross wall-rooms	3.000	4.000	0.450	0.450		2.430

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Toilet	3.000	1.500	0.450	0.450		0.911
	Ramp	1.000	6.000	1.500	(0.60+0.15)/2		3.375
	Soak pit	1.000	4*1.25	0.200	1.000		1.000
	Septic Tank -bed slab	1.000	6.000	2.500	0.150		2.250
	Septic Tank -side wall	2.000	2.100	0.200	1.100		0.924
	Septic Tank -side wall	2.000	0.600	0.200	1.100		0.264
	Septic Tank - baffle wall	2.000	2.100	0.150	0.800		0.504
	Septic Tank - cover slab	1.000	6.000	2.500	0.150		2.250
	Soak pit -cover slab	1.000	1.250	1.250	0.100		0.156
	Total						**71.603**
						Total Quantity in cum	**71.603**
1.009	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	Columns						
	GF	24.000	0.300	0.400	3.300		9.504
	Porch	2.000	0.300	0.400	3.300		0.792
	FF	8.000	0.300	0.400	3.000		2.880
	FF	16.000	0.300	0.400	0.800		1.536
	Total						**14.712**
	Lintel						
	GF-Long wall	3.000	21.500	0.200	0.150		1.935
	Short wall	3.000	13.000	0.200	0.150		1.170
	Cross wall-rooms	3.000	4.000	0.200	0.150		0.360
	Toilet	3.000	2.700	0.200	0.150		0.243
		1.000	5.000	0.300	0.150		0.225
	FF- Long wall	2.000	13.000	0.200	0.150		0.780
	Short wall	2.000	3.600	0.200	0.150		0.216

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**4.929**
	Beam						
	longitudinal	6+2	3.850	0.300	0.350		3.234
		6+2	3.600	0.300	0.350		3.024
		7+2	4.750	0.300	0.350		4.489
	transverse	4+4	3.500	0.300	0.350		2.940
		8.000	5.800	0.300	0.350		4.872
		4.000	2.300	0.300	0.350		0.966
	porch	2.000	4.400	0.300	0.350		0.924
	Total						**20.449**
	Roof slab						
	GF	1.000	22.000	13.600	0.120		35.904
	Deduct stair room	-1.000	8.000	3.600	0.120		-3.456
	porch	1.000	5.400	4.200	0.120		2.722
	FF	1.000	13.600	4.400	0.120		7.181
	Total						**42.351**
	Sunshade						
	GF -Long wall	2.000	22.600	0.600	(0.1+0.07)/2		2.305
	Short	2.000	13.400	0.600	(0.1+0.07)/2		1.367
	FF	1.000	22.400	0.600	(0.1+0.07)/2		1.142
		2.000	3.000	0.600	(0.1+0.07)/2		0.306
	Total						**5.120**
	Sunshade						
	waist slab	1.000	3.400	1.500	0.120		0.612
	waist slab	1.000	3.900	1.500	0.120		0.702
	waist slab	1.000	1.000	1.500	0.120		0.180
	step	22.000	0.300	1.500	.15/2		0.743
	landing	2.000	1.500	1.500	0.120		0.540
	Total						**2.777**
						Total Quantity in cum	**90.338**
1.010	5.34.1						
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Columns						
	GF	24.000	0.300	0.400	3.300		9.504
	Porch	2.000	0.300	0.400	3.300		0.792
	FF	8.000	0.300	0.400	3.000		2.880
	FF	16.000	0.300	0.400	0.800		1.536
	Total						**14.712**
	RCC- upto plinth level						
	Footing	26.000	2.000	2.000	0.200		20.800
		26.000	1/3	(2*2)+(0.5*0.5)+(2*0.5)	0.200		9.100
	Footing pedestal	26.000	0.500	0.500	1.000		6.500
	Stair bottom slab	1.000	1.500	1.000	0.120		0.180
	Plinth beam-Long wall	3.000	21.500	0.450	0.450		13.061
	Short wall	3.000	13.000	0.450	0.450		7.898
	Cross wall-rooms	3.000	4.000	0.450	0.450		2.430
	Toilet	3.000	1.500	0.450	0.450		0.911
	Ramp	1.000	6.000	1.500	(0.60+0.15)/2		3.375
	Soak pit	1.000	4*1.25	0.200	1.000		1.000
	Septic Tank -bed slab	1.000	6.000	2.500	0.150		2.250
	Septic Tank -side wall	2.000	2.100	0.200	1.100		0.924
	Septic Tank -side wall	2.000	0.600	0.200	1.100		0.264
	Septic Tank - baffle wall	2.000	2.100	0.150	0.800		0.504
	Septic Tank - cover slab	1.000	6.000	2.500	0.150		2.250
	Soak pit -cover slab	1.000	1.250	1.250	0.100		0.156
	Total						**71.603**
	Lintel						
	GF-Long wall	3.000	21.500	0.200	0.150		1.935
	Short wall	3.000	13.000	0.200	0.150		1.170
	Cross wall-rooms	3.000	4.000	0.200	0.150		0.360
	Toilet	3.000	2.700	0.200	0.150		0.243
		1.000	5.000	0.300	0.150		0.225
	FF- Long wall	2.000	13.000	0.200	0.150		0.780

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Short wall	2.000	3.600	0.200	0.150		0.216
	Total						**4.929**
	Beam						
	longitudinal	6+2	3.850	0.300	0.350		3.234
		6+2	3.600	0.300	0.350		3.024
		7+2	4.750	0.300	0.350		4.489
	transverse	4+4	3.500	0.300	0.350		2.940
		8.000	5.800	0.300	0.350		4.872
		4.000	2.300	0.300	0.350		0.966
	porch	2.000	4.400	0.300	0.350		0.924
	Total						**20.449**
	Roof slab						
	GF	1.000	22.000	13.600	0.120		35.904
	Deduct stair room	-1.000	8.000	3.600	0.120		-3.456
	porch	1.000	5.400	4.200	0.120		2.722
	FF	1.000	13.600	4.400	0.120		7.181
	Total						**42.351**
	Sunshade						
	GF -Long wall	2.000	22.600	0.600	(0.1+0.07)/2		2.305
	Short	2.000	13.400	0.600	(0.1+0.07)/2		1.367
	FF	1.000	22.400	0.600	(0.1+0.07)/2		1.142
		2.000	3.000	0.600	(0.1+0.07)/2		0.306
	Total						**5.120**
	Sunshade						
	waist slab	1.000	3.400	1.500	0.120		0.612
	waist slab	1.000	3.900	1.500	0.120		0.702
	waist slab	1.000	1.000	1.500	0.120		0.180
	step	22.000	0.300	1.500	.15/2		0.743
	landing	2.000	1.500	1.500	0.120		0.540
	Total						**2.777**
						Total Quantity in cum	**161.941**
1.011	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	Footing & foundations						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Footing PCC	4*26	2.200		0.150		34.320
	Footing RCC	4*26	2.000		.2+.2		83.200
	Pedestal	4*26	0.500		1.000		52.000
	PCC- Long wall	3.000	21.500		0.150		9.675
	Short wall	3.000	13.000		0.150		5.850
	Cross wall-rooms	3.000	4.000		0.150		1.800
	Toilet	3.000	1.500		0.150		0.675
	Step	1.000	5.000		0.150		0.750
	Septic Tank-bed slab	1.000	6+2.5		0.150		1.275
	Soak pit-bed slab	1.000	1.250+1.250		0.150		0.375
	Septic Tank -side wall	2*2	2.1+6		1.100		35.640
	Septic Tank - baffle wall	2*2	2.100		0.800		6.720
	Septic Tank - cover slab	2.000	6+2.5		0.150		2.550
	Soak pit -cover slab	4.000	1.250		0.100		0.500
	Total						**235.330**
						Total Quantity in sqm	**235.330**
1.012	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Slabs						
	Waist slab	2.000	3.400		0.120		0.816
		1.000	3.400	1.500			5.100
		2.000	1.000		0.120		0.240
		1.000	1.000	1.500			1.500
		2.000	3.900		0.120		0.936
		1.000	3.900	1.500			5.850
	Step	22.000	0.300		.15/2		0.495
	Landing	2.000	1.500	1.500			4.500
	Roof slab-GF	1.000	22.000	13.600			299.200
	Roof slab-GF	2.000	22+13.6		0.120		8.544
	Deduct stair room	-1.000	8.000	3.600			-28.800
	porch roof slab	1.000	5.400	4.200			22.680
	porch roof slab	2.000	5.400+4.2		0.120		2.304

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Roof slab- FF	1.000	13.600	4.400			59.840
	Roof slab- FF	2.000	13.6+4.4		0.120		4.320
	Total						**387.525**
	Sunshade						
	GF -Long wall	2.000	22.600	0.600			27.120
		1.000	22.600		(0.1+0.07)/2		1.921
	Short	2.000	13.400	0.600			16.080
		1.000	13.400		(0.1+0.07)/2		1.139
	FF	2.000	22.400	0.600			26.880
		1.000	22.400		(0.1+0.07)/2		1.904
		2.000	3.000	0.600			3.600
		1.000	3.000		(0.1+0.07)/2		0.255
	Total						**78.899**
					Total Quantity in sqm		**466.424**
1.013	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	Plinth beam						
	Plinth beam-Long wall	2*3.000	21.500		0.450		58.050
	Short wall	2*3.000	13.000		0.450		35.100
	Cross wall-rooms	2*3.000	4.000	0.450	0.450		4.860
	Toilet	2*3.000	1.500	0.450	0.450		1.823
	Total						**99.833**
	Lintel						
	GF-Long wall	2*3.000	21.500		0.150		19.350
	Short wall	2*3.000	13.000		0.150		11.700
	Cross wall-rooms	2*3.000	4.000		0.150		3.600
	Toilet	2*3.000	2.700		0.150		2.430
		2*1.000	5.000		0.150		1.500

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	FF- Long wall	2*2.000	13.000		0.150		7.800
	Short wall	2*2.000	3.600		0.150		2.160
	Total						**48.540**
	Beams						
	longitudinal	2*8	3.850		0.350		21.560
		8.000	3.850	0.300			9.240
		2*8	3.600		0.350		20.160
		8.000	3.600	0.300			8.640
		2*9	4.750		0.350		29.925
		9.000	4.750	0.300			12.825
	transverse	2*8	3.500		0.350		19.600
		7.000	3.500	0.300			7.350
		2*8.000	5.800		0.350		32.480
		8.000	5.800	0.300			13.920
		2*4.000	2.300		0.350		6.440
		4.000	2.300	0.300			2.760
	porch	2*2.000	4.400		0.350		6.160
		2.000	4.400	0.300			2.640
	Total						**193.700**
						Total Quantity in sqm	**342.073**
1.014	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	Columns						
	GF	24.000	(0.300+0.4)*2		3.300		110.880
	porch column	2.000	(0.300+0.4)*2		3.300		9.240
	FF	8.000	(0.300+0.4)*2		3.000		33.600
		16.000	(0.300+0.4)*2		0.800		17.920
	Total						**171.640**
						Total Quantity in sqm	**171.640**
1.015	5.9.7						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Centering and shuttering including strutting, etc. and removal of form for:Stairs, (excluding landings) except spiral - staircases)						
	Stair steps						
	Step	22.000	1.500		0.150		4.950
	Step	22.000	0.300		.15/2		0.495
	Total						**5.445**
						Total Quantity in sqm	**5.445**
1.016	OD5511/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR						
	Steel						
	LS Qty-80kg/m3 For item no.5	72.000				80.000000	5760.000
	For item no.9	14.712				80.000000	1176.960
	For item no.10	75.626				80.000000	6050.080
	Total						**12987.040**
						Total Quantity in kilogram	**12987.040**
1.017	50.6.7.2						
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.						
	Laterite masonry						
	GF-Long wall	3.000	21.500	0.200	3.300		42.570
	Short wall	3.000	13.000	0.200	3.300		25.740
	Cross wall-rooms	3.000	4.000	0.200	3.300		7.920
	Toilet	3.000	2.700	0.200	3.300		5.346
	Step	1.000	5.000	0.600	0.300		0.900
		1.000	5.000	0.300	0.300		0.450
	FF- Long wall	2.000	13.000	0.200	3.000		15.600
	Parapet wall	1.000	17.26+13.4+17.26	0.150	0.800		5.750
	Toilet	3.000	2.700	0.200	3.300		5.346
	Rolling shutter	-1.000	4.600	0.200	3.000		-2.760
	Door-D	-2.000	1.200	0.200	2.100		-1.008
	D1	-5.000	1.000	0.200	2.100		-2.100
	Window	-12.000	1.500	0.200	1.500		-5.400

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	V1	-3.000	0.600	0.200	0.600		-0.216
	Glass panes	-2.000	3.700	0.200	1.500		-2.220
	Glass panes	-2.000	1.160	0.200	1.500		-0.696
	Glass panes	-2.000	3.500	0.200	1.500		-2.100
	Glass panes	-3.000	1.260	0.200	1.500		-1.134
	Glass panes	-1.000	2.100	0.200	1.500		-0.630
	Glass panes	-1.000	4.900	0.200	1.500		-1.470
	Total						**89.888**
						Total Quantity in cum	**89.888**
1.018	21.1.1.1						
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)						
	Aluminium door						
	Frame- Door D	2.000	5.400			2.000000	21.600
	Door D1	5.000	5.200			2.000000	52.000
	Shutter - Door D	2.000	8.400			1.000000	16.800
	Door D1	5.000	7.600			1.000000	38.000
	Window frame	12.000	4*(1.5+.8)			2.000000	220.800
	V1	3.000	4*0.600			2.000000	14.400
	Frames-Glass panes	2.000	2*(3.7+1.5)			2.000000	41.600
	Glass panes	2.000	2*(1.16+1.5)			2.000000	21.280
	Glass panes	2.000	2*(3.5+1.5)			2.000000	40.000
	Glass panes	3.000	2*(1.26+1.5)			2.000000	33.120

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Glass panes	1.000	2*(2.1+1.5)			2.000000	14.400
	Glass panes	1.000	2*(4.9+1.5)			2.000000	25.600
	Total						**539.600**
						Total Quantity in kg	**539.600**
1.019	21.2.2						
	Providing and fixing 12 mm thick prelaminated particle board flat pressed three layer or graded wood particle board conforming to IS : 12823 Grade I Type II, in panelling fixed in aluminum doors, windows shutters and partition frames with C.P. brass / stainless steel screws etc. complete as per architectural drawings and directions of Engineer - in- Charge.Pre- laminated particle board with decorative lamination on both sides						
	Panelling-Prelaminated particle board						
	Door D	2.000	1.000		0.900		1.800
	Door D1	5.000	0.800		0.900		3.600
	Total						**5.400**
						Total Quantity in sqm	**5.400**
1.020	21.3.2						
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 5.50 mm thickness						
	Glazing						
	Door-D	2.000	0.900		0.800		1.440
	D1	5.000	0.700		0.800		2.800
	Window	2*12.000	1.300		0.600		18.720
	V1	3.000	0.400		0.400		0.480
	Glass panes	2.000	3.600		1.400		10.080
	Glass panes	2.000	1.060		1.400		2.968
	Glass panes	2.000	3.400		1.400		9.520
	Glass panes	3.000	1.160		1.400		4.872
	Glass panes	1.000	2.000		1.400		2.800
	Glass panes	1.000	4.800		1.400		6.720
	Total						**60.400**
						Total Quantity in sqm	**60.400**
1.021	9.116						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing sliding arrangement in racks/ cupboards/cabinets shutter by with stainless steel rollers to run inside C or E aluminium channel section (The payment of C or E channel shall be made separately						
	Sliding arrangement						
	Windows	4*12					48.000
	Total						**48.000**
						Total Quantity in no	**48.000**
1.022	9.117.1						
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 48x40 mm						
	frame						
	D2	2*3	2.100				12.600
	D2	3.000	0.800				2.400
	Total						**15.000**
						Total Quantity in metre	**15.000**
1.023	9.118.1						
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).						
	Shutter						
	D2	3.000	0.800		2.000		4.800
	Total						**4.800**
						Total Quantity in sqm	**4.800**
1.024	9.53						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	Hold fast						
	Door	7*6				1.000000	42.000
	Window	12*4				1.000000	48.000
	V	3*2				1.000000	6.000
	Total						**96.000**
						Total Quantity in each	**96.000**
1.025	9.97.5						
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:100x10 mm						
	Tower bolt						
	Doors	12.000					12.000
	Total						**12.000**
						Total Quantity in no	**12.000**
1.026	9.88						
	Providing and fixing chromium plated brass 100 mm mortice latch and lock with 6 levers and a pair of lever handles of approved quality with necessary screws etc. complete.						
	Mortice latch						
	Doors	7.000					7.000
	Total						**7.000**
						Total Quantity in no	**7.000**
1.027	50.9.15.1						
	Supplying and fixing 200 mm Aluminium aldrop						
	Aluminium aldrop						
	For door D2	3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.028	10.6.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover						
	Rolling shutter						
	RS at entrance	1.000	4.600		3.000		13.800
	RS -FF	1.000	3.550		2.700		9.585
	Total						**23.385**
						Total Quantity in sqm	**23.385**
1.029	50.18.9.22.8						
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement -110 mm dia Vent cowl						
	Vent cowl						
	For toilet	3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.030	50.18.7.4.2						
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall						
	PVC Pipe						
	32mm	60.000					60.000
	Total						**60.000**
						Total Quantity in metre	**60.000**
1.031	50.18.7.6.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 10 Kfg/cm - Internal work- Exposed on wall						
	PVC Pipe						
	50mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.032	50.18.9.4.2						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing PVC pipes includings joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 32 mm dia 6 Kgf/cm2						
	PVC Pipe						
	32mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.033	50.18.9.9.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2						
	PVC Pipe						
	110mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.034	50.18.9.13.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 25 mm dia 10 Kgf/cm2- External work - Exposed on wall						
	PVC Pipe						
	25mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.035	50.18.9.14.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - External work - Exposed on wall						
	PVC Pipe						
	32mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.036	50.18.9.18.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall						
	PVC Pipe						
	75mm	50.000					50.000
	Total						**50.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in metre	**50.000**
1.037	50.18.9.19.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/ clips/ at 1.00 m spacing . This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 mm dia 6 Kgf/cm2 - External work- Exposed on wall						
	PVC Pipe						
	110mm	40.000					40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.038	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	Plastering-outside						
	GF	2.000	21.5+13.41		3.300		230.406
	FF	2.000	13.41+4		3.000		104.460
	Parapet wall	1.000	(17.26*2)+13.41		0.800+.8+.10		81.481
	Car porch column	2*2.000	.3+.4		3.300		9.240
	FF- Columns	6.000	(0.3+0.4)*2		0.800		6.720
		6.000	0.300	0.400			0.720
	Sunshade-GF - Long wall	2*2.000	22.600	0.600			54.240
	Short	2*2.000	13.400	0.600			32.160
	FF	2*1.000	22.400	0.600			26.880
		2*2.000	3.000	0.600			7.200
	Total						**553.507**
	Inside						
	Entrance & Stair room	2.000	13+3.6		3.300		109.560
	office room	2.000	4+6		3.300		66.000
	store room	2.000	4+4		3.300		52.800
	rest room	2.000	4+4		3.300		52.800
	toilet	2*3	1.5+1.2		3.300		53.460
	wash area	2.000	2.2+2.6		3.300		31.680
	cabin side	2.000	8.8+17.2		3.300		171.600

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	FF	2.000	13+3.6		3.000		99.600
	Column sides	3.000	(0.3+0.4) *2		3.300		13.860
	Total						**651.360**
	Deductions						
	Rolling shutter	-2*1.000	4.600		3.000	1.000000	-27.600
	Door-D	-2.000	1.200		2.100	1.000000	-5.040
	D1	-5.000	1.000		2.100	1.000000	-10.500
	Window	-12.000	1.500		1.500	1.000000	-27.000
	V1	-3.000	0.600		0.600	1.000000	-1.080
	Glass panes	-2*2.000	3.700		1.500	1.000000	-22.200
	Glass panes	-2.000	1.160		1.500	1.000000	-3.480
	Glass panes	-2*2.000	3.500		1.500	1.000000	-21.000
	Glass panes	-3.000	1.260		1.500	1.000000	-5.670
	Glass panes	-1.000	2.100		1.500	1.000000	-3.150
	Glass panes	-2*1.000	4.900		1.500	1.000000	-14.700
	Total						**-141.420**
						Total Quantity in sqm	**1063.447**
1.039	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	Ceiling plastering						
	Entrance and stair room	1.000	13.000	3.600			46.800
	office room	1.000	4.000	6.000			24.000
	store room	1.000	4.000	4.000			16.000
	rest room	1.000	4.000	4.000			16.000
	toilet	2.000	1.500	1.200			3.600
	wash area	1.000	2.200	2.600			5.720

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	cabin side	1.000	8.800	17.200			151.360
	FF	2.000	13.000	3.600			93.600
	Beams-longitudinal	6+2	3.850		.35+.3+.35		30.800
		6+2	3.600		.35+.3+.35		28.800
		7+2	4.750		.35+.3+.35		42.750
	transverse	4+4	3.500		.35+.3+.35		28.000
		8.000	5.800		.35+.3+.35		46.400
		4.000	2.300		.35+.3+.35		9.200
	porch	2.000	4.400		.35+.3+.35		8.800
	Total						**551.830**
						Total Quantity in sqm	**551.830**
1.040	11.36						
	Providing and fixing I st quality ceramic glazed wall tiles conforming to IS : 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer -in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3 kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.						
	Wall tiles						
	Toilet	2*3.000	1.5+1.2		1.500		24.300
	Wash area	1.000	2.000		0.700		1.400
	Total						**25.700**
						Total Quantity in sqm	**25.700**
1.041	11.41.2						
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.						
	Floor Tile						
	Entrance and stair room	1.000	13.000	3.600			46.800
	office room	1.000	4.000	6.000			24.000
	store room	1.000	4.000	4.000			16.000
	rest room	1.000	4.000	4.000			16.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	toilet	2.000	1.500	1.200			3.600
	wash area	1.000	2.200	2.600			5.720
	cabin side	1.000	8.800	17.200			151.360
	FF	1.000	13.000	3.600			46.800
	For Skirting - 15% of floor area	46.8+24+16+16+3.6+5.72+151.36+46.8				0.150000	46.542
	Step	2.000	5.000	0.300			3.000
		2.000	5.000		0.150		1.500
	Total						**361.322**
						Total Quantity in sqm	**361.322**
1.042	13.47.1						
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)						
	Exterior Paint						
	GF	2.000	21.5+13.41		3.300		230.406
	FF	2.000	13.41+4		3.000		104.460
	Parapet wall	1.000	(17.26*2)+13.41		0.800+.8+.10		81.481
	Car porch column	2*2.000	.3+.4		3.300		9.240
	FF- Columns	6.000	(0.3+0.4)*2		0.800		6.720
		6.000	0.300	0.400			0.720
	Sunshade-GF - Long wall	2*2.000	22.600	0.600			54.240
	Short	2*2.000	13.400	0.600			32.160
	FF	2*1.000	22.400	0.600			26.880
		2*2.000	3.000	0.600			7.200
	Total						**553.507**
						Total Quantity in sqm	**553.507**
1.043	13.48.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm						
	Interior Paint						
	Entrance & Stair room	2.000	13+3.6		3.300		109.560
	office room	2.000	4+6		3.300		66.000
	store room	2.000	4+4		3.300		52.800
	rest room	2.000	4+4		3.300		52.800
	toilet	2*3	1.5+1.2		3.300		53.460
	wash area	2.000	2.2+2.6		3.300		31.680
	cabin side	2.000	8.8+17.2		3.300		171.600
	FF	2.000	13+3.6		3.000		99.600
	Column sides	3.000	(0.3+0.4) *2		3.300		13.860
	Deductions-Rolling shutter	-2*1.000	4.600		3.000		-27.600
	Door-D	-2.000	1.200		2.100		-5.040
	D1	-5.000	1.000		2.100		-10.500
	Window	-12.000	1.500		1.500		-27.000
	V1	-3.000	0.600		0.600		-1.080
	Glass panes	-2*2.000	3.700		1.500		-22.200
	Glass panes	-2.000	1.160		1.500		-3.480
	Glass panes	-2*2.000	3.500		1.500		-21.000
	Glass panes	-3.000	1.260		1.500		-5.670
	Glass panes	-1.000	2.100		1.500		-3.150
	Glass panes	-2*1.000	4.900		1.500		-14.700
	Toilet- wall tile	-2*3	1.5+1.2		1.500		-24.300
	wash area- wall tile	-1.000	2.000		0.700		-1.400
	Ceiling- Entrance and stair room	1.000	13.000	3.600			46.800
	office room	1.000	4.000	6.000			24.000
	store room	1.000	4.000	4.000			16.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rest room	1.000	4.000	4.000			16.000
	toilet	2.000	1.500	1.200			3.600
	wash area	1.000	2.200	2.600			5.720
	cabin side	1.000	8.800	17.200			151.360
	FF	2.000	13.000	3.600			93.600
	Beams-longitudinal	6+2	3.850		.35+.3+.35		30.800
		6+2	3.600		.35+.3+.35		28.800
		7+2	4.750		.35+.3+.35		42.750
	transverse	4+4	3.500		.35+.3+.35		28.000
		8.000	5.800		.35+.3+.35		46.400
		4.000	2.300		.35+.3+.35		9.200
	porch	2.000	4.400		.35+.3+.35		8.800
	Total						**1036.070**
						Total Quantity in sqm	**1036.070**
1.044	13.52.1						
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work						
	Epoxy paint						
	RS at entrance	2.000	4.600		3.000	1.100000	30.360
	RS -FF	2.000	3.550		2.700	1.100000	21.087
	Total						**51.447**
						Total Quantity in sqm	**51.447**
1.045	10.28						
	Providing and fixing stainless steel (Grade 304) railing made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners, stainless steel bolts etc., of required size on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.)						
	Hand Rail						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	50mm Pipe	1.000	10.000			2.400000	24.000
	40mm Pipe	10.000	0.800			1.910000	15.280
		2.000	10.000			1.910000	38.200
	Total						**77.480**
						Total Quantity in kg	**77.480**
1.046	17.3.1						
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.C. pan with ISI marked white solid plastic seat and lid						
	WC						
	Water Closet	3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.047	50.17.1.4						
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.						
	Health Faucet						
		3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.048	17.7.3						
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 550x400 mm with a pair of 15 mm C.P. brass pillar taps						
	Wash basin						
	Wash basin	3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.049	18.51.1						
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore						
	Bib cock						
	Bib cock	6.000					6.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**6.000**
						Total Quantity in each	**6.000**
1.050	18.52.1						
	Providing and fixing C.P brass stop cock (concealed) of standard design and of approved make conforming to IS: 893115 mm nominal bore						
	Stop cock						
	For Health faucet and water closet	3*2					6.000
	For wash basin	3.000					3.000
	Total						**9.000**
						Total Quantity in each	**9.000**
1.051	17.73.1						
	Providing and fixing PTMT towel rail complete with brackets fixed to wooden cleats with CP brass screws with concealed fitting arrangement of approved quality and colour450 mm long towel rail with total length of 495 mm, 78 mm wide and effective height of 88 mm. weighing not less than 170 gms						
	Towel rail						
	For wash room	2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.052	21.12.2						
	Providing and fixing aluminium tubular handle bar 32 mm outer dia, 3.0mm thick & 2100 mm long with S.S. screws etc. complete as per direction of Engineer -in-Charge.Powder coated minimum thickness 50 micron aluminium tubular handle bar						
	Aluminium handle bar						
	For doors	7*2					14.000
	Total						**14.000**
						Total Quantity in no	**14.000**
1.053	17.74						
	Providing and fixing PTMT shelf 440 mm long, 124 mm width and 36 mm height of approved quality and colour, weighing not less than 300 gms.						
	PTMT Shelf						
	For Toilet	3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.054	18.65						
	Providing and fixing PTMT Soap Dish Holder having length of 138 mm, breadth 102 mm, height of 75 mm with concealed fittings arrangements, weighing not less than 106 gms.						
	Soap dish						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		4.000					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**
1.055	17.71						
	Providing and fixing PTMT liquid soap container 109 mm wide, 125 mm high and 112 mm distance from wall of standard shape with bracket of the same materials with snap fittings of approved quality and colour, weighing not less than 105 gms						
	Fixing liquid soap container						
	liquid soap container	2.000					2.000
	Total						**2.000**
						Total Quantity in each	**2.000**
1.056	17.10.1.2						
	Providing and fixing Stainless Steel A ISI 304 (18/8) kitchen sink as per IS 13983 with C.I. brackets and stainless steel plug 40 mm, including painting of fittings and brackets, cutting and making good the walls wherever required: Kitchen sink with drain board510x 1040 mm bowl depth 225 mm						
	Kitchen sink						
	In rest room	1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
1.057	17.31						
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.						
	Fixing mirror						
	mirror	2.000					2.000
	Total						**2.000**
						Total Quantity in each	**2.000**
1.058	18.48						
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.						
	Water tank						
	Water tank	1.000	1000.000				1000.000
	Total						**1000.000**
						Total Quantity in Litre	**1000.000**
1.059	8.2.2.2						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing 18 mm thick gang saw cut, mirror, polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations, of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.Area of slab over 0.50 sqm						
	Inauguration stones						
	Inauguration stone	1.000	1.000	0.700			0.700
	Total						**0.700**
						Total Quantity in sqm	**0.700**
1.060	16.21						
	Engraving letters in hard stone						
	Engraving on the inauguration stone						
	For inauguration stone	200.000			2.000		400.000
	Total						**400.000**
						Total Quantity in per Letter per cm height	**400.000**
1.061	13.71						
	Lettering with black Japan pint of approved brand and manufacture						
	For lettering on Office Name Board						
	say 200Letters	200.000			3.000		600.000
	Total						**600.000**
						Total Quantity in per Letter per cm height	**600.000**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Water Supply Arrangements in the Harbour-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Construction of OH RCC Water Tank and Pump House**			
1.001	2.31			
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared			
	Net Total	400.000sqm	@14.48/sqm	5792.00
1.002	OD1292/2022-2023			
	Chipping and removing top of RCC piles to lines and levels carefully without damaging remaining portion of pile and removing debris upto a distance of 150 m including all labour charges , hire of equipments etc.complete as per directions of departmental officers at site Unit- cum Taking output - 1.25 cum			
	Net Total	2.543cum	@3537.94/cum	8996.98
1.003	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	65.340cum	@210.02/cum	13722.71
1.004	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	6.534cum	@6687.21/cum	43694.23
1.005	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	33.074cum	@9237.20/cum	305511.15
1.006	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content			

Sl No	Specification	Quantity	Rate	Amount
	as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	88.000cum	@10858.36/cum	955535.68
1.007	5.34.1			
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	121.074cum	@80.55/cum	9752.51
1.008	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	38.280sqm	@329.03/sqm	12595.27
1.009	OD5503/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - HCR Fe-500D or more			
	Net Total	13858.800kg	@96.62/kg	1339037.26
1.010	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	179.280sqm	@847.44/sqm	151929.04
1.011	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	200.160sqm	@800.47/sqm	160222.08
1.012	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	133.770sqm	@637.63/sqm	85295.77
1.013	50.6.7.2			
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.			
	Net Total	12.900cum	@7872.96/cum	101561.18
1.014	9.143			
	Providing and fixing factory made uPVC door frame, made of uPVC extruded			

Sl No	Specification	Quantity	Rate	Amount
	section, of size 65 mm x 55 mm with wall thickness 2.0 mm (? 0.2mm), corners of the door frame to be mitred cut and jointed with plastic brackets and stainless steel screws, reinforcing hinge side vertical of the frames with PVC profile of Size 28 mm x 30 mm having wall thickness 2 mm (? 0.2 mm), including providing & fixing 3 nos of 125 mm long stainless steel hinges to the frame, fixing the frame with jamb with required number & size of anchor dash fastners, all complete as per manufacturer's specification and direction of Engineer-in-charge.			
	Net Total	6.500metre	@610.23/metre	3966.50
1.015	9.142.2			
	35 mm thick factory made Solid panel PVC Door shutter, made out of single piece extruded solid PVC (±0.2 mm) thick, having styles & rails (except lock rail) of size 95 mmx 35 mm x 5 mm, out of which 75 mm shall be flat and 20 mm shall be tapered (on both side), having one side thickness of 15 mm integrally extruded on the hinges side of the profile for better screw holding power, including reinforcing with MS tube of size 40 mm x 20 mm x 1 mm, joints of styles & rails to be mitered cut & joint with the help of PVC solvent cement, self driven self tapping screws & M.S. rectangular pipes bracket of size 190 mm x 100 mm of cross section size 35 mm x 17 mm s 1 mm at each corner. Single piece extruded 5 mm thick solid PVC Lock rail of size 115 mm x 35 mm x 35 mm, out of which 95 mm to be flat and 20 mm to be tapered at both ends, having 15 mm solid core in middle of rail section integrally extruded, fixing the styles & rails with the help of solvent and self driven self tapping screws of 125 mm x 11 mm, including providing 5 mm Single piece solid PVC extruded sheet inserted in the door as panel, all complete as per manufacturer's specification and direction of Engineer-in-charge.Decorative finish (wood grained finish)			
	Net Total	2.100sqm	@4438.67/sqm	9321.21
1.016	9.147.5			
	Providing and fixing factory made uPVC white colour casement/casement cum fixed glazed windows comprising of uPVC multi-chambered frame, sash and mullion (where ever required) extruded profiles duly reinforced with 1.60 +/- 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), uPVC extruded glazing beads of appropriate dimension, EPDM gasket, stainless steel (SS 304 grade) friction hinges, zinc alloy (white powder coated) casement handles, G.I fasteners 100 x 8 mm size for fixing frame to finished wall, plastic packers, plastic caps and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, mullion (if required) shall be also fusion welded including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, all complete as per approved drawing & direction of Engineer-in-Charge. (Single / double glass panes and silicon sealant shall be paid separately) Note: For uPVC frame, sash and mullion extruded profiles minus 5% tolerance in dimension i.e. in depth & width of profile shall be acceptable.Casement window double panels with S.S. friction hinges (350 x 19 x 1.9 mm) made of (big series)frame 67 x 60 mm & sash / mullion 67 x 80 mm both having wall thickness of 2.3 ± 0.2 mm and single glazing bead/ double glazing bead of appropriate dimension. (Area of window above 1.50 sqm).			
	Net Total	3.000sqm	@11164.86/sqm	33494.58

Sl No	Specification	Quantity	Rate	Amount
1.017	9.7.7.1			
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick: Float glass panes4 mm thick glass pane			
	Net Total	2.240sqm	@2070.48/sqm	4637.88
1.018	9.100.2			
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm			
	Net Total	2.000no	@61.02/no	122.04
1.019	9.97.3			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm			
	Net Total	4.000no	@103.95/no	415.80
1.020	50.9.15.2			
	Supplying and fixing 300 mm Aluminium aldrop			
	Net Total	1.000no	@188.93/no	188.93
1.021	13.7.2			
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	577.730sqm	@379.14/sqm	219040.55
1.022	13.15			
	20 mm cement plaster 1:2 (1 cement : 2 stone dust)			
	Net Total	3.000sqm	@476.55/sqm	1429.65
1.023	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	151.640sqm	@262.57/sqm	39816.11
1.024	10.25.2			
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works			
	Net Total	4000.000kg	@151.29/kg	605160.00
1.025	13.43.1			
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	729.370sqm	@69.33/sqm	50567.22
1.026	13.60.1			
	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade:Two or more coats on new work			
	Net Total	729.370sqm	@148.59/sqm	108377.09
1.027	50.18.9.9.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2			
	Net Total	150.000metre	@521.14/metre	78171.00
1.028	50.18.8.8.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 75 mm pipe 6 Kgf/cm2			
	Net Total	20.000metre	@614.17/metre	12283.40
1.029	18.17.5			
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :65 mm nominal bore			
	Net Total	5.000each	@1718.82/each	8594.10
1.030	50.18.9.8.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2			
	Net Total	1000.000metre	@356.56/metre	356560.00
1.031	50.18.7.4.2			
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall			
	Net Total	750.000metre	@295.71/metre	221782.50
1.032	18.17.2			
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :32 mm nominal bore			
	Net Total	10.000each	@671.37/each	6713.70
1.033	18.32.1			
	Constructing masonry chamber 30x30x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for stop cock, with C.I. surface box 100x100x75 mm (inside) with hinged cover fixed in cement concrete slab 1:2:4 mix (1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm			

Sl No	Specification	Quantity	Rate	Amount
	nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S (non modular) bricks of class designation 7.5			
	Net Total	3.000each	@1827.73/each	5483.19
1.034	50.18.9.21.4			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend			
	Net Total	10.000no	@87.89/no	878.90
1.035	50.18.9.21.9			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling			
	Net Total	5.000no	@72.21/no	361.05
1.036	18.59.2			
	Providing and fixing C.I double acting air valve of approved quality with bolts, nuts, rubber insertion etc. complete (The tail pieces, tapers etc. if required will be paid separately):80 mm dia			
	Net Total	3.000no	@7208.30/no	21624.90
1.037	50.18.9.6.2			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2			
	Net Total	100.000metre	@240.68/metre	24068.00
1.038	50.18.9.21			
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Elbow			
	Net Total	10.000no	@94.28/no	942.80
1.039	50.18.9.21.5			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee			
	Net Total	10.000no	@94.65/no	946.50
1.040	18.15.2			
	Providing and fixing brass bib cock of approved quality :20 mm nominal bore			
	Net Total	20.000each	@377.04/each	7540.80
1.041	18.60.1			
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore			
	Net Total	1.000each	@4130.60/each	4130.60
			Heading Total(Rs)	5020264.86

Sl No	Specification	Quantity	Rate	Amount
2	**Pile liners and miscellaneous items for piling**			
2.001	12.22			
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.			
	Net Total	4.033MT	@125636.20/MT	506690.79
2.002	OD1321/2022-2023			
	Driving down vertically M.s Liner already fabricated to the required depth by power winch and accessories including all hire charge of machinery , labour charges etc complete			
	Net Total	45.000metre	@568.30/metre	25573.50
2.003	OD1325/2022-2023			
	Supply, Fitting and Placing in position reinforcement in cages using HCR bar Reinforcement including cost of materials, labour charges, conveyance and placing the cages in bore holes providing precast cover blocks etc, complete as per Drawing and Technical Specificationsand as directed by Engineer in charge excluding cost of welding charges. Unit = 1 MT Taking output = 1 MT a) Material			
	Net Total	38.565tonne	@98321.63/tonne	3791773.66
2.004	12.23.3			
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm			
	Net Total	225.000metre	@7210.41/metre	1622342.25
			Heading Total(Rs)	5946380.20
3	**Construction of Sump**			
3.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	65.340cum	@210.02/cum	13722.71
3.002	60.7.4			
	DR PACKING FOR APRONS - Rough stone dry packing for apron with good quality blasted rubble including packing to compactness to lines levels, cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site			
	Net Total	19.602cum	@3557.50/cum	69734.12
3.003	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4			

Sl No	Specification	Quantity	Rate	Amount
	coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	6.534cum	@6687.21/cum	43694.23
3.004	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	3.960sqm	@329.03/sqm	1302.96
3.005	5.9.2			
	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.			
	Net Total	125.600sqm	@703.77/sqm	88393.51
3.006	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	34.020sqm	@800.47/sqm	27231.99
3.007	5.1.2			
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size			
	Net Total	8.000cum	@8914.94/cum	71319.52
3.008	5.2.2			
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)			
	Net Total	13.000cum	@10748.82/cum	139734.66
3.009	5.3			
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).			
	Net Total	6.000cum	@11277.61/cum	67665.66
3.010	5.22.1			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelMild steel and Medium Tensile steel bars			
	Net Total	640.000kg	@94.84/kg	60697.60
3.011	5.22A.1			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Mild steel and Medium			

Sl No	Specification	Quantity	Rate	Amount
	Tensile steel bars			
	Net Total	2160.000kilogram	@94.84/kilogram	204854.40
3.012	50.13.1			
	9 mm cement plastering of mix : 1:3 (1 cement : 3 fine sand) including all cost of materials, labour charges etc complete			
	Net Total	59.200sqm	@285.84/sqm	16921.73
3.013	13.9.1			
	Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster			
	Net Total	66.400sqm	@404.42/sqm	26853.49
3.014	50.18.9.19.2			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 m dia 4 Kgf/cm2 - External work - Exposed on wall			
	Net Total	10.000metre	@329.39/metre	3293.90
3.015	50.18.9.8.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2			
	Net Total	50.000metre	@356.56/metre	17828.00
3.016	50.18.9.18.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall			
	Net Total	50.000metre	@279.39/metre	13969.50
3.017	50.18.7.6.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing . This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 6 Kgf/cm2 - Internal work- Exposed on wall			
	Net Total	20.000metre	@369.84/metre	7396.80
3.018	50.18.9.6.2			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2			
	Net Total	20.000metre	@240.68/metre	4813.60
3.019	50.18.9.21.4			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	5.000no	@87.89/no	439.45
3.020	50.18.9.21.5			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee			
	Net Total	5.000no	@94.65/no	473.25
3.021	50.18.9.21.8			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75 mm dia End cap			
	Net Total	1.000no	@64.08/no	64.08
3.022	50.18.9.21.9			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling			
	Net Total	2.000no	@72.21/no	144.42
3.023	18.37.1			
	Constructing masonry chamber 60x45x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for water meter complete with C.I double flap surface box 400x200x200 mm (inside) with locking arrangement and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 grades stone aggregate 20 nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S. (non modular) bricks of class designation 7.5			
	Net Total	1.000each	@9587.28/each	9587.28
3.024	18.60.1			
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore			
	Net Total	1.000each	@4130.60/each	4130.60
			Heading Total(Rs)	894267.46
			Total Estimation PAC	11860912.52

Sl No	Description	Percentage/LS	Amount
4	**Lumsum Heading**		
4.001	LS provision for part TS		
	0.00	0.00%	2000000.00
4.002	Water connection charges (KWA)		
	0.00	0.00%	1000000.00
4.003	LS Amount for Electrification		
	0.00	0.00%	1900000.00
		Total Lumsum Amount	4900000.00

Sl No	Specification	Quantity	Rate	Amount
5	**Extra Charges**			
4.001	Provision for GST			
		11860912.52	18.00%	2134964.25
			Grand Total	18895876.77
			Round off	4123.23
			Rounded Total(Rs)	18900000.00
	Rupees One Crore Eighty Nine Lakh			

ePRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Water Supply Arrangements in the Harbour-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Construction of OH RCC Water Tank and Pump House						
1.001	2.31						
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared						
	site clearance						
		1.000	20.000	20.000			400.000
	Total						**400.000**
						Total Quantity in sqm	**400.000**
1.002	OD1292/2022-2023						
	Chipping and removing top of RCC piles to lines and levels carefully without damaging remaining portion of pile and removing debris upto a distance of 150 m including all labour charges , hire of equipments etc.complete as per directions of departmental officers at site Unit- cum Taking output - 1.25 cum						
	for pile						
		9.000	3.140/4	.6*.6	1.000	1.000000	2.543
	Total						**2.543**
						Total Quantity in cum	**2.543**
1.003	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	for pile cap						
		1.000	6.600	6.600	1.500		65.340
	Total						**65.340**
						Total Quantity in cum	**65.340**
1.004	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	for pile pcc						
		1.000	6.600	6.600	0.150		6.534
	Total						**6.534**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**6.534**
1.005	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	column upto GL and footing						
	column upto GL	9.000	0.600	0.600	0.700		2.268
	Raft	1.000	6.400	6.400	0.750		30.720
	rounding	1.000	0.086				0.086
	Total						**33.074**
						Total Quantity in cum	**33.074**
1.006	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	columns and walls						
	column from GL to top	9.000	0.400	0.400	12.450		17.928
	Wall of water tank	2.000	6.000	0.250	3.000		9.000
		2.000	5.600	0.250	3.000		8.400
	rounding	1.000	2.672				2.672
	Total						**38.000**
	Beams and slab						
	tie beams	12*3	2.400	0.300	0.300		7.776
	haunch	24*3	0.300	0.300	0.300		1.944
	bottom slab for tank	1.000	7.600	7.600	0.250		14.440
	bottom beam for slab	3.000	6.000	0.300	0.300		1.620
		3.000	5.100	0.300	0.300		1.377

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	top slab cover	1.000	6.000	6.000	0.120		4.320
	slab on GF	1.000	7.600	7.600	0.150		8.664
	slab projections	2*4	7.600	0.800	0.150		7.296
	lintel GF	1.000	6.000	0.200	0.200		0.240
	sunshade GF	1.000	6.000	0.600	0.100		0.360
	rounding	1.000	1.963				1.963
	Total						**50.000**
						Total Quantity in cum	**88.000**
1.007	5.34.1						
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	column upto GL and footing						
	column upto GL	9.000	0.600	0.600	0.700		2.268
	Raft	1.000	6.400	6.400	0.750		30.720
	rounding	1.000	0.086				0.086
	Total						**33.074**
	columns and walls						
	column from GL to top	9.000	0.400	0.400	12.450		17.928
	Wall of water tank	2.000	6.000	0.250	3.000		9.000
		2.000	5.600	0.250	3.000		8.400
	rounding	1.000	2.672				2.672
	Total						**38.000**
	Beams and slab						
	tie beams	12*3	2.400	0.300	0.300		7.776
	haunch	24*3	0.300	0.300	0.300		1.944
	bottom slab for tank	1.000	7.600	7.600	0.250		14.440
	bottom beam for slab	3.000	6.000	0.300	0.300		1.620
		3.000	5.100	0.300	0.300		1.377
	top slab cover	1.000	6.000	6.000	0.120		4.320
	slab on GF	1.000	7.600	7.600	0.150		8.664
	slab projections	2*4	7.600	0.800	0.150		7.296
	lintel GF	1.000	6.000	0.200	0.200		0.240
	sunshade GF	1.000	6.000	0.600	0.100		0.360

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	1.963				1.963
	Total						**50.000**
						Total Quantity in cum	**121.074**
1.008	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	for pile cap						
	for pcc	4.000	6.600		0.150		3.960
	for pile cap	4.000	6.400		0.750		19.200
	column upto GL	9.000	2.400		0.700		15.120
	Total						**38.280**
						Total Quantity in sqm	**38.280**
1.009	OD5503/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - HCR Fe-500D or more						
	Reinforcement						
		1.000	38.000			120.000000	4560.000
		1.000	50.000			120.000000	6000.000
	Total						**10560.000**
	column						
	column upto GL	9.000	0.600	0.600	0.700	100.000000	226.800
	Raft	1.000	6.400	6.400	0.750	100.000000	3072.000
	Total						**3298.800**
						Total Quantity in kg	**13858.800**
1.010	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	column						
		9.000	1.600		12.450		179.280
	Total						**179.280**
						Total Quantity in sqm	**179.280**
1.011	5.9.3						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	slabs						
	bottom slab for tank	1.000	7.600	7.600			57.760
	top slab cover	1.000	6.000	6.000			36.000
	slab on GF	1.000	7.600	7.600			57.760
	slab projections	2*4	7.600	0.800			48.640
	Total						**200.160**
						Total Quantity in sqm	**200.160**
1.012	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	beams						
	tie beams	12*3	2.400	0.900			77.760
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	lintel GF	1.000	6.000	0.400			2.400
	Sunshade GF	1.000	6.000	0.700			4.200
	Total						**133.770**
						Total Quantity in sqm	**133.770**
1.013	50.6.7.2						
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.						
	Pump house at GF						
	long wall	2.000	6.000	0.200	3.000		7.200
	cross wall	2.000	5.600	0.200	3.000		6.720
	Total						**13.920**
	deduction						
	door	-1.000	1.000	0.200	2.100		-0.420
	window	-1.000	2.000	0.200	1.500		-0.600
	Total						**-1.020**
						Total Quantity in cum	**12.900**
1.014	9.143						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing factory made uPVC door frame, made of uPVC extruded section, of size 65 mm x 55 mm with wall thickness 2.0 mm (? 0.2mm), corners of the door frame to be mitred cut and jointed with plastic brackets and stainless steel screws, reinforcing hinge side vertical of the frames with PVC profile of Size 28 mm x 30 mm having wall thickness 2 mm (? 0.2 mm), including providing & fixing 3 nos of 125 mm long stainless steel hinges to the frame, fixing the frame with jamb with required number & size of anchor dash fastners, all complete as per manufacturer's specification and direction of Engineer-in-charge.						
	door						
		1.000	6.500				6.500
	Total						**6.500**
						Total Quantity in metre	**6.500**
1.015	9.142.2						
	35 mm thick factory made Solid panel PVC Door shutter, made out of single piece extruded solid PVC (±0.2 mm) thick, having styles & rails (except lock rail) of size 95 mmx 35 mm x 5 mm, out of which 75 mm shall be flat and 20 mm shall be tapered (on both side), having one side thickness of 15 mm integrally extruded on the hinges side of the profile for better screw holding power, including reinforcing with MS tube of size 40 mm x 20 mm x 1 mm, joints of styles & rails to be mitered cut & joint with the help of PVC solvent cement, self driven self tapping screws & M.S. rectangular pipes bracket of size 190 mm x 100 mm of cross section size 35 mm x 17 mm s 1 mm at each corner. Single piece extruded 5 mm thick solid PVC Lock rail of size 115 mm x 35 mm x 35 mm, out of which 95 mm to be flat and 20 mm to be tapered at both ends, having 15 mm solid core in middle of rail section integrally extruded, fixing the styles & rails with the help of solvent and self driven self tapping screws of 125 mm x 11 mm, including providing 5 mm Single piece solid PVC extruded sheet inserted in the door as panel, all complete as per manufacturer's specification and direction of Engineer-in-charge.Decorative finish (wood grained finish)						
	door						
		1.000	1.000		2.100		2.100
	Total						**2.100**
						Total Quantity in sqm	**2.100**
1.016	9.147.5						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing factory made uPVC white colour casement/casement cum fixed glazed windows comprising of uPVC multi-chambered frame, sash and mullion (where ever required) extruded profiles duly reinforced with 1.60 +/- 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), uPVC extruded glazing beads of appropriate dimension, EPDM gasket, stainless steel (SS 304 grade) friction hinges, zinc alloy (white powder coated) casement handles, G.I fasteners 100 x 8 mm size for fixing frame to finished wall, plastic packers, plastic caps and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, mullion (if required) shall be also fusion welded including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, all complete as per approved drawing & direction of Engineer-in-Charge. (Single / double glass panes and silicon sealant shall be paid separately) Note: For uPVC frame, sash and mullion extruded profiles minus 5% tolerance in dimension i.e. in depth & width of profile shall be acceptable.Casement window double panels with S.S. friction hinges (350 x 19 x 1.9 mm) made of (big series)frame 67 x 60 mm & sash / mullion 67 x 80 mm both having wall thickness of 2.3 ± 0.2 mm and single glazing bead/ double glazing bead of appropriate dimension. (Area of window above 1.50 sqm).						
	window						
		1.000	2.000		1.500		3.000
	Total						**3.000**
						Total Quantity in sqm	**3.000**
1.017	9.7.7.1						
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick: Float glass panes4 mm thick glass pane						
	window						
		4.000	0.400		1.400		2.240
	Total						**2.240**
						Total Quantity in sqm	**2.240**
1.018	9.100.2						
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm						
	door						
		2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.019	9.97.3						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm						
	door						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.020	50.9.15.2						
	Supplying and fixing 300 mm Aluminium aldrop						
	for door						
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.021	13.7.2						
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:4 (1 cement : 4 fine sand)						
	plastering						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	Total						**448.730**
	pump house						
	long wall	2*2	6.000		3.000		72.000
	cross wall	2*2	5.600		3.000		67.200
	door	-1*2	1.000		2.100		-4.200
	window	-1*2	2.000		1.500		-6.000
	Total						**129.000**
						Total Quantity in sqm	**577.730**
1.022	13.15						
	20 mm cement plaster 1:2 (1 cement : 2 stone dust)						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Inside water tank						
	Floor of slab (excluding haunch)	1.000					1.000
	Vertical sides	1.000					1.000
	Haunchings	1.000					1.000
	Total						**3.000**
						Total Quantity in sqm	**3.000**
1.023	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	ceiling						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**151.640**
1.024	10.25.2						
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works						
	For Ladder						
	Ladder for (Stage height 12.45 m)	4.000	1000.000			1.000000	4000.000
	Total						**4000.000**
						Total Quantity in kg	**4000.000**
1.025	13.43.1						
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	painting						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	pump house-long wall	2*2	6.000		3.000		72.000
	do-cross wall	2*2	5.600		3.000		67.200
	do-door	-1*2	1.000		2.100		-4.200
	do-window	-1*2	2.000		1.500		-6.000
	Total						**577.730**
	painting ceilings						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**729.370**
1.026	13.60.1						
	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade:Two or more coats on new work						
	painting						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	pump house-long wall	2*2	6.000		3.000		72.000
	do-cross wall	2*2	5.600		3.000		67.200
	do-door	-1*2	1.000		2.100		-4.200

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	do-window	-1*2	2.000		1.500		-6.000
	Total						**577.730**
	painting ceiling						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**729.370**
1.027	50.18.9.9.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2						
	pipe line						
		150.000					150.000
	Total						**150.000**
						Total Quantity in metre	**150.000**
1.028	50.18.8.8.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 75 mm pipe 6 Kgf/cm2						
	pipe line						
		20.000					20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
1.029	18.17.5						
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :65 mm nominal bore						
	for supply lines						
		5.000					5.000
	Total						**5.000**
						Total Quantity in each	**5.000**
1.030	50.18.9.8.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	supply line						
		1000.000					1000.000
	Total						**1000.000**
						Total Quantity in metre	**1000.000**
1.031	50.18.7.4.2						
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall						
	pipe line						
		1.000	750.000				750.000
	Total						**750.000**
						Total Quantity in metre	**750.000**
1.032	18.17.2						
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :32 mm nominal bore						
	for supply lines						
		10.000					10.000
	Total						**10.000**
						Total Quantity in each	**10.000**
1.033	18.32.1						
	Constructing masonry chamber 30x30x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for stop cock, with C.I. surface box 100x100x75 mm (inside) with hinged cover fixed in cement concrete slab 1:2:4 mix (1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S (non modular) bricks of class designation 7.5						
	for inspection chamber						
		3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.034	50.18.9.21.4						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend						
	bend						
		10.000					10.000
	Total						**10.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in no	**10.000**
1.035	50.18.9.21.9						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling						
	socket						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
1.036	18.59.2						
	Providing and fixing C.I double acting air valve of approved quality with bolts, nuts, rubber insertion etc. complete (The tail pieces, tapers etc. if required will be paid separately):80 mm dia						
	air valve						
		3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.037	50.18.9.6.2						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2						
	pipe line						
		100.000					100.000
	Total						**100.000**
						Total Quantity in metre	**100.000**
1.038	50.18.9.21						
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Elbow						
	elbow						
		10.000					10.000
	Total						**10.000**
						Total Quantity in no	**10.000**
1.039	50.18.9.21.5						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee						
	tee						
		10.000					10.000
	Total						**10.000**
						Total Quantity in no	**10.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.040	18.15.2						
	Providing and fixing brass bib cock of approved quality :20 mm nominal bore						
	bib cock						
		20.000					20.000
	Total						**20.000**
						Total Quantity in each	**20.000**
1.041	18.60.1						
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore						
	water meter						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
2	Pile liners and miscellaneous items for piling						
2.001	12.22						
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.						
	6 mm liner 47.1 kg/m2						
		9.000	3.14*.606	47.1/1000	5.000		4.033
	Total						**4.033**
						Total Quantity in MT	**4.033**
2.002	OD1321/2022-2023						
	Driving down vertically M.s Liner already fabricated to the required depth by power winch and accessories including all hire charge of machinery , labour charges etc complete						
	6mm thk liner for piles						
		9.000	5.000				45.000
	Total						**45.000**
						Total Quantity in metre	**45.000**
2.003	OD1325/2022-2023						
	Supply, Fitting and Placing in position reinforcement in cages using HCR bar Reinforcement including cost of materials, labour charges, conveyance and placing the cages in bore holes providing precast cover blocks etc, complete as per Drawing and Technical Specificationsand as directed by Engineer in charge excluding cost of welding charges. Unit = 1 MT Taking output = 1 MT a) Material						
	for pile						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	pile 80kg/m3	9.000	25.000	3.140	0.600	0.080000	33.912
	pile cap 120kg/m3	1.000	6.400	6.400	0.750	0.120000	3.686
	rounding	1.000	0.967				0.967
	Total						**38.565**
						Total Quantity in tonne	**38.565**
2.004	12.23.3						
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm						
	Piles						
		9.000	25.000				225.000
	Total						**225.000**
						Total Quantity in metre	**225.000**
3	Construction of Sump						
3.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	sump						
		1.000	6.600	6.600	1.500		65.340
	Total						**65.340**
						Total Quantity in cum	**65.340**
3.002	60.7.4						
	DR PACKING FOR APRONS - Rough stone dry packing for apron with good quality blasted rubble including packing to compactness to lines levels, cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site						
	sump						
		1.000	6.600	6.600	0.450		19.602
	Total						**19.602**
						Total Quantity in cum	**19.602**
3.003	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	for sump						
	foundation	1.000	6.600	6.600	0.150		6.534

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**6.534**
						Total Quantity in cum	**6.534**
3.004	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	for sump						
	base slab	4.000	6.600		0.150		3.960
	Total						**3.960**
						Total Quantity in sqm	**3.960**
3.005	5.9.2						
	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.						
	for sump						
	side wall inner	4.000	5.600		2.000		44.800
	side wall inner	4.000	2.700		2.000		21.600
	side wall outer	8.000	2.700		2.000		43.200
	side wall edges	8.000	1.000		2.000		16.000
	Total						**125.600**
						Total Quantity in sqm	**125.600**
3.006	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	for sump						
	covering slab	2.000	6.300	2.700			34.020
	Total						**34.020**
						Total Quantity in sqm	**34.020**
3.007	5.1.2						
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size						
	for sump						
	bed slab	1.000	6.300	6.300	0.200		7.938
	rounding	1.000	0.062				0.062
	Total						**8.000**
						Total Quantity in cum	**8.000**
3.008	5.2.2						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)						
	for sump						
	Side walls	8.000	2.700	0.200	2.000		8.640
	do-projections	8.000	0.350	0.350	2.000		1.960
	Side wall inner	1.000	5.600	0.200	2.000		2.240
	rounding	1.000	0.160				0.160
	Total						**13.000**
						Total Quantity in cum	**13.000**
3.009	5.3						
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).						
	for sump						
	covering slab	1.000	6.300	6.300	0.150		5.954
	rounding	1.000	0.046				0.046
	Total						**6.000**
						Total Quantity in cum	**6.000**
3.010	5.22.1						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelMild steel and Medium Tensile steel bars						
	for sump						
	For bed slab-80kg/m3	1.000	8.000			80.000000	640.000
	Total						**640.000**
						Total Quantity in kg	**640.000**
3.011	5.22A.1						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Mild steel and Medium Tensile steel bars						
	for sump						
	For side wall-120kg/m3	1.000	13.000			120.000000	1560.000
	For covering slab-100kg/m3	1.000	6.000			100.000000	600.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**2160.000**
						Total Quantity in kilogram	**2160.000**
3.012	50.13.1						
	9 mm cement plastering of mix : 1:3 (1 cement : 3 fine sand) including all cost of materials, labour charges etc complete						
	for sump						
	side walls outside	8.000	2.700		2.000		43.200
	do-projections	8.000	1.000		2.000		16.000
	Total						**59.200**
						Total Quantity in sqm	**59.200**
3.013	13.9.1						
	Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster						
	for sump						
	side walls inside	4.000	5.600		2.000		44.800
	side walls inside	4.000	2.700		2.000		21.600
	Total						**66.400**
						Total Quantity in sqm	**66.400**
3.014	50.18.9.19.2						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 m dia 4 Kgf/cm2 - External work - Exposed on wall						
	for sump						
		1.000	10.000				10.000
	Total						**10.000**
						Total Quantity in metre	**10.000**
3.015	50.18.9.8.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2						
	for sump						
		1.000	50.000				50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
3.016	50.18.9.18.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for sump						
		1.000	50.000				50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
3.017	50.18.7.6.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing . This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 6 Kgf/cm2 - Internal work- Exposed on wall						
	for sump						
		1.000	20.000				20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
3.018	50.18.9.6.2						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2						
	for sump						
		1.000	20.000				20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
3.019	50.18.9.21.4						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend						
	for sump						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
3.020	50.18.9.21.5						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee						
	for sump						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
3.021	50.18.9.21.8						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75 mm dia End cap						
	for sump						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
3.022	50.18.9.21.9						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling						
	for sump						
		2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
3.023	18.37.1						
	Constructing masonry chamber 60x45x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for water meter complete with C.I double flap surface box 400x200x200 mm (inside) with locking arrangement and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 grades stone aggregate 20 nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S. (non modular) bricks of class designation 7.5						
	Inspection Chamber						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
3.024	18.60.1						
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore						
	water meter						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Water Supply Arrangements in the Harbour-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Construction of OH RCC Water Tank and Pump House**			
1.001	2.31			
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared			
	Net Total	400.000sqm	@14.48/sqm	5792.00
1.002	OD1292/2022-2023			
	Chipping and removing top of RCC piles to lines and levels carefully without damaging remaining portion of pile and removing debris upto a distance of 150 m including all labour charges , hire of equipments etc.complete as per directions of departmental officers at site Unit- cum Taking output - 1.25 cum			
	Net Total	2.543cum	@3537.94/cum	8996.98
1.003	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	65.340cum	@210.02/cum	13722.71
1.004	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	6.534cum	@6687.21/cum	43694.23
1.005	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	33.074cum	@9237.20/cum	305511.15
1.006	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content			

Sl No	Specification	Quantity	Rate	Amount
	as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	88.000cum	@10858.36/cum	955535.68
1.007	5.34.1			
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	121.074cum	@80.55/cum	9752.51
1.008	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	38.280sqm	@329.03/sqm	12595.27
1.009	OD5503/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - HCR Fe-500D or more			
	Net Total	13858.800kg	@96.62/kg	1339037.26
1.010	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	179.280sqm	@847.44/sqm	151929.04
1.011	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	200.160sqm	@800.47/sqm	160222.08
1.012	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	133.770sqm	@637.63/sqm	85295.77
1.013	50.6.7.2			
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.			
	Net Total	12.900cum	@7872.96/cum	101561.18
1.014	9.143			
	Providing and fixing factory made uPVC door frame, made of uPVC extruded			

Sl No	Specification	Quantity	Rate	Amount
	section, of size 65 mm x 55 mm with wall thickness 2.0 mm (? 0.2mm), corners of the door frame to be mitred cut and jointed with plastic brackets and stainless steel screws, reinforcing hinge side vertical of the frames with PVC profile of Size 28 mm x 30 mm having wall thickness 2 mm (? 0.2 mm), including providing & fixing 3 nos of 125 mm long stainless steel hinges to the frame, fixing the frame with jamb with required number & size of anchor dash fastners, all complete as per manufacturer's specification and direction of Engineer-in-charge.			
	Net Total	6.500metre	@610.23/metre	3966.50
1.015	9.142.2			
	35 mm thick factory made Solid panel PVC Door shutter, made out of single piece extruded solid PVC (±0.2 mm) thick, having styles & rails (except lock rail) of size 95 mmx 35 mm x 5 mm, out of which 75 mm shall be flat and 20 mm shall be tapered (on both side), having one side thickness of 15 mm integrally extruded on the hinges side of the profile for better screw holding power, including reinforcing with MS tube of size 40 mm x 20 mm x 1 mm, joints of styles & rails to be mitered cut & joint with the help of PVC solvent cement, self driven self tapping screws & M.S. rectangular pipes bracket of size 190 mm x 100 mm of cross section size 35 mm x 17 mm s 1 mm at each corner. Single piece extruded 5 mm thick solid PVC Lock rail of size 115 mm x 35 mm x 35 mm, out of which 95 mm to be flat and 20 mm to be tapered at both ends, having 15 mm solid core in middle of rail section integrally extruded, fixing the styles & rails with the help of solvent and self driven self tapping screws of 125 mm x 11 mm, including providing 5 mm Single piece solid PVC extruded sheet inserted in the door as panel, all complete as per manufacturer's specification and direction of Engineer-in-charge.Decorative finish (wood grained finish)			
	Net Total	2.100sqm	@4438.67/sqm	9321.21
1.016	9.147.5			
	Providing and fixing factory made uPVC white colour casement/casement cum fixed glazed windows comprising of uPVC multi-chambered frame, sash and mullion (where ever required) extruded profiles duly reinforced with 1.60 +/- 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), uPVC extruded glazing beads of appropriate dimension, EPDM gasket, stainless steel (SS 304 grade) friction hinges, zinc alloy (white powder coated) casement handles, G.I fasteners 100 x 8 mm size for fixing frame to finished wall, plastic packers, plastic caps and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, mullion (if required) shall be also fusion welded including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, all complete as per approved drawing & direction of Engineer-in-Charge. (Single / double glass panes and silicon sealant shall be paid separately) Note: For uPVC frame, sash and mullion extruded profiles minus 5% tolerance in dimension i.e. in depth & width of profile shall be acceptable.Casement window double panels with S.S. friction hinges (350 x 19 x 1.9 mm) made of (big series)frame 67 x 60 mm & sash / mullion 67 x 80 mm both having wall thickness of 2.3 ± 0.2 mm and single glazing bead/ double glazing bead of appropriate dimension. (Area of window above 1.50 sqm).			
	Net Total	3.000sqm	@11164.86/sqm	33494.58

Sl No	Specification	Quantity	Rate	Amount
1.017	9.7.7.1			
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick: Float glass panes4 mm thick glass pane			
	Net Total	2.240sqm	@2070.48/sqm	4637.88
1.018	9.100.2			
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm			
	Net Total	2.000no	@61.02/no	122.04
1.019	9.97.3			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm			
	Net Total	4.000no	@103.95/no	415.80
1.020	50.9.15.2			
	Supplying and fixing 300 mm Aluminium aldrop			
	Net Total	1.000no	@188.93/no	188.93
1.021	13.7.2			
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	577.730sqm	@379.14/sqm	219040.55
1.022	13.15			
	20 mm cement plaster 1:2 (1 cement : 2 stone dust)			
	Net Total	3.000sqm	@476.55/sqm	1429.65
1.023	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	151.640sqm	@262.57/sqm	39816.11
1.024	10.25.2			
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works			
	Net Total	4000.000kg	@151.29/kg	605160.00
1.025	13.43.1			
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	729.370sqm	@69.33/sqm	50567.22
1.026	13.60.1			
	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade:Two or more coats on new work			
	Net Total	729.370sqm	@148.59/sqm	108377.09
1.027	50.18.9.9.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2			
	Net Total	150.000metre	@521.14/metre	78171.00
1.028	50.18.8.8.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 75 mm pipe 6 Kgf/cm2			
	Net Total	20.000metre	@614.17/metre	12283.40
1.029	18.17.5			
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :65 mm nominal bore			
	Net Total	5.000each	@1718.82/each	8594.10
1.030	50.18.9.8.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2			
	Net Total	1000.000metre	@356.56/metre	356560.00
1.031	50.18.7.4.2			
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall			
	Net Total	750.000metre	@295.71/metre	221782.50
1.032	18.17.2			
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :32 mm nominal bore			
	Net Total	10.000each	@671.37/each	6713.70
1.033	18.32.1			
	Constructing masonry chamber 30x30x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for stop cock, with C.I. surface box 100x100x75 mm (inside) with hinged cover fixed in cement concrete slab 1:2:4 mix (1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm			

Sl No	Specification	Quantity	Rate	Amount
	nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S (non modular) bricks of class designation 7.5			
	Net Total	3.000each	@1827.73/each	5483.19
1.034	50.18.9.21.4			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend			
	Net Total	10.000no	@87.89/no	878.90
1.035	50.18.9.21.9			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling			
	Net Total	5.000no	@72.21/no	361.05
1.036	18.59.2			
	Providing and fixing C.I double acting air valve of approved quality with bolts, nuts, rubber insertion etc. complete (The tail pieces, tapers etc. if required will be paid separately):80 mm dia			
	Net Total	3.000no	@7208.30/no	21624.90
1.037	50.18.9.6.2			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2			
	Net Total	100.000metre	@240.68/metre	24068.00
1.038	50.18.9.21			
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Elbow			
	Net Total	10.000no	@94.28/no	942.80
1.039	50.18.9.21.5			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee			
	Net Total	10.000no	@94.65/no	946.50
1.040	18.15.2			
	Providing and fixing brass bib cock of approved quality :20 mm nominal bore			
	Net Total	20.000each	@377.04/each	7540.80
1.041	18.60.1			
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore			
	Net Total	1.000each	@4130.60/each	4130.60
			Heading Total(Rs)	5020264.86

Sl No	Specification	Quantity	Rate	Amount
2	**Pile liners and miscellaneous items for piling**			
2.001	12.22			
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.			
	Net Total	4.033MT	@125636.20/MT	506690.79
2.002	OD1321/2022-2023			
	Driving down vertically M.s Liner already fabricated to the required depth by power winch and accessories including all hire charge of machinery , labour charges etc complete			
	Net Total	45.000metre	@568.30/metre	25573.50
2.003	OD1325/2022-2023			
	Supply, Fitting and Placing in position reinforcement in cages using HCR bar Reinforcement including cost of materials, labour charges, conveyance and placing the cages in bore holes providing precast cover blocks etc, complete as per Drawing and Technical Specificationsand as directed by Engineer in charge excluding cost of welding charges. Unit = 1 MT Taking output = 1 MT a) Material			
	Net Total	38.565tonne	@98321.63/tonne	3791773.66
2.004	12.23.3			
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm			
	Net Total	225.000metre	@7210.41/metre	1622342.25
			Heading Total(Rs)	5946380.20
3	**Construction of Sump**			
3.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	65.340cum	@210.02/cum	13722.71
3.002	60.7.4			
	DR PACKING FOR APRONS - Rough stone dry packing for apron with good quality blasted rubble including packing to compactness to lines levels, cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site			
	Net Total	19.602cum	@3557.50/cum	69734.12
3.003	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4			

Sl No	Specification	Quantity	Rate	Amount
	coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	6.534cum	@6687.21/cum	43694.23
3.004	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	3.960sqm	@329.03/sqm	1302.96
3.005	5.9.2			
	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.			
	Net Total	125.600sqm	@703.77/sqm	88393.51
3.006	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	34.020sqm	@800.47/sqm	27231.99
3.007	5.1.2			
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size			
	Net Total	8.000cum	@8914.94/cum	71319.52
3.008	5.2.2			
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)			
	Net Total	13.000cum	@10748.82/cum	139734.66
3.009	5.3			
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).			
	Net Total	6.000cum	@11277.61/cum	67665.66
3.010	5.22.1			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelMild steel and Medium Tensile steel bars			
	Net Total	640.000kg	@94.84/kg	60697.60
3.011	5.22A.1			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Mild steel and Medium			

Sl No	Specification	Quantity	Rate	Amount
	Tensile steel bars			
	Net Total	2160.000kilogram	@94.84/kilogram	204854.40
3.012	50.13.1			
	9 mm cement plastering of mix : 1:3 (1 cement : 3 fine sand) including all cost of materials, labour charges etc complete			
	Net Total	59.200sqm	@285.84/sqm	16921.73
3.013	13.9.1			
	Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster			
	Net Total	66.400sqm	@404.42/sqm	26853.49
3.014	50.18.9.19.2			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 m dia 4 Kgf/cm2 - External work - Exposed on wall			
	Net Total	10.000metre	@329.39/metre	3293.90
3.015	50.18.9.8.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2			
	Net Total	50.000metre	@356.56/metre	17828.00
3.016	50.18.9.18.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall			
	Net Total	50.000metre	@279.39/metre	13969.50
3.017	50.18.7.6.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing . This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 6 Kgf/cm2 - Internal work- Exposed on wall			
	Net Total	20.000metre	@369.84/metre	7396.80
3.018	50.18.9.6.2			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2			
	Net Total	20.000metre	@240.68/metre	4813.60
3.019	50.18.9.21.4			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	5.000no	@87.89/no	439.45
3.020	50.18.9.21.5			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee			
	Net Total	5.000no	@94.65/no	473.25
3.021	50.18.9.21.8			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75 mm dia End cap			
	Net Total	1.000no	@64.08/no	64.08
3.022	50.18.9.21.9			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling			
	Net Total	2.000no	@72.21/no	144.42
3.023	18.37.1			
	Constructing masonry chamber 60x45x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for water meter complete with C.I double flap surface box 400x200x200 mm (inside) with locking arrangement and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 grades stone aggregate 20 nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S. (non modular) bricks of class designation 7.5			
	Net Total	1.000each	@9587.28/each	9587.28
3.024	18.60.1			
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore			
	Net Total	1.000each	@4130.60/each	4130.60
			Heading Total(Rs)	894267.46
			Total Estimation PAC	11860912.52

Sl No	Description	Percentage/LS	Amount
4	**Lumsum Heading**		
4.001	LS provision for part TS		
	0.00	0.00%	2000000.00
4.002	Water connection charges (KWA)		
	0.00	0.00%	1000000.00
4.003	LS Amount for Electrification		
	0.00	0.00%	1900000.00
		Total Lumsum Amount	4900000.00

Sl No	Specification	Quantity	Rate	Amount
5	**Extra Charges**			
4.001	Provision for GST			
		11860912.52	18.00%	2134964.25
			Grand Total	18895876.77
			Round off	4123.23
			Rounded Total(Rs)	18900000.00
	Rupees One Crore Eighty Nine Lakh			

ePRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Water Supply Arrangements in the Harbour-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Construction of OH RCC Water Tank and Pump House						
1.001	2.31						
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared						
	site clearance						
		1.000	20.000	20.000			400.000
	Total						**400.000**
						Total Quantity in sqm	**400.000**
1.002	OD1292/2022-2023						
	Chipping and removing top of RCC piles to lines and levels carefully without damaging remaining portion of pile and removing debris upto a distance of 150 m including all labour charges , hire of equipments etc.complete as per directions of departmental officers at site Unit- cum Taking output - 1.25 cum						
	for pile						
		9.000	3.140/4	.6*.6	1.000	1.000000	2.543
	Total						**2.543**
						Total Quantity in cum	**2.543**
1.003	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	for pile cap						
		1.000	6.600	6.600	1.500		65.340
	Total						**65.340**
						Total Quantity in cum	**65.340**
1.004	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	for pile pcc						
		1.000	6.600	6.600	0.150		6.534
	Total						**6.534**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**6.534**
1.005	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	column upto GL and footing						
	column upto GL	9.000	0.600	0.600	0.700		2.268
	Raft	1.000	6.400	6.400	0.750		30.720
	rounding	1.000	0.086				0.086
	Total						**33.074**
						Total Quantity in cum	**33.074**
1.006	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	columns and walls						
	column from GL to top	9.000	0.400	0.400	12.450		17.928
	Wall of water tank	2.000	6.000	0.250	3.000		9.000
		2.000	5.600	0.250	3.000		8.400
	rounding	1.000	2.672				2.672
	Total						**38.000**
	Beams and slab						
	tie beams	12*3	2.400	0.300	0.300		7.776
	haunch	24*3	0.300	0.300	0.300		1.944
	bottom slab for tank	1.000	7.600	7.600	0.250		14.440
	bottom beam for slab	3.000	6.000	0.300	0.300		1.620
		3.000	5.100	0.300	0.300		1.377

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	top slab cover	1.000	6.000	6.000	0.120		4.320
	slab on GF	1.000	7.600	7.600	0.150		8.664
	slab projections	2*4	7.600	0.800	0.150		7.296
	lintel GF	1.000	6.000	0.200	0.200		0.240
	sunshade GF	1.000	6.000	0.600	0.100		0.360
	rounding	1.000	1.963				1.963
	Total						**50.000**
						Total Quantity in cum	**88.000**
1.007	5.34.1						
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	column upto GL and footing						
	column upto GL	9.000	0.600	0.600	0.700		2.268
	Raft	1.000	6.400	6.400	0.750		30.720
	rounding	1.000	0.086				0.086
	Total						**33.074**
	columns and walls						
	column from GL to top	9.000	0.400	0.400	12.450		17.928
	Wall of water tank	2.000	6.000	0.250	3.000		9.000
		2.000	5.600	0.250	3.000		8.400
	rounding	1.000	2.672				2.672
	Total						**38.000**
	Beams and slab						
	tie beams	12*3	2.400	0.300	0.300		7.776
	haunch	24*3	0.300	0.300	0.300		1.944
	bottom slab for tank	1.000	7.600	7.600	0.250		14.440
	bottom beam for slab	3.000	6.000	0.300	0.300		1.620
		3.000	5.100	0.300	0.300		1.377
	top slab cover	1.000	6.000	6.000	0.120		4.320
	slab on GF	1.000	7.600	7.600	0.150		8.664
	slab projections	2*4	7.600	0.800	0.150		7.296
	lintel GF	1.000	6.000	0.200	0.200		0.240
	sunshade GF	1.000	6.000	0.600	0.100		0.360

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	1.963				1.963
	Total						**50.000**
						Total Quantity in cum	**121.074**
1.008	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	for pile cap						
	for pcc	4.000	6.600		0.150		3.960
	for pile cap	4.000	6.400		0.750		19.200
	column upto GL	9.000	2.400		0.700		15.120
	Total						**38.280**
						Total Quantity in sqm	**38.280**
1.009	OD5503/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - HCR Fe-500D or more						
	Reinforcement						
		1.000	38.000			120.000000	4560.000
		1.000	50.000			120.000000	6000.000
	Total						**10560.000**
	column						
	column upto GL	9.000	0.600	0.600	0.700	100.000000	226.800
	Raft	1.000	6.400	6.400	0.750	100.000000	3072.000
	Total						**3298.800**
						Total Quantity in kg	**13858.800**
1.010	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	column						
		9.000	1.600		12.450		179.280
	Total						**179.280**
						Total Quantity in sqm	**179.280**
1.011	5.9.3						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	slabs						
	bottom slab for tank	1.000	7.600	7.600			57.760
	top slab cover	1.000	6.000	6.000			36.000
	slab on GF	1.000	7.600	7.600			57.760
	slab projections	2*4	7.600	0.800			48.640
	Total						**200.160**
						Total Quantity in sqm	**200.160**
1.012	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	beams						
	tie beams	12*3	2.400	0.900			77.760
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	lintel GF	1.000	6.000	0.400			2.400
	Sunshade GF	1.000	6.000	0.700			4.200
	Total						**133.770**
						Total Quantity in sqm	**133.770**
1.013	50.6.7.2						
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.						
	Pump house at GF						
	long wall	2.000	6.000	0.200	3.000		7.200
	cross wall	2.000	5.600	0.200	3.000		6.720
	Total						**13.920**
	deduction						
	door	-1.000	1.000	0.200	2.100		-0.420
	window	-1.000	2.000	0.200	1.500		-0.600
	Total						**-1.020**
						Total Quantity in cum	**12.900**
1.014	9.143						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing factory made uPVC door frame, made of uPVC extruded section, of size 65 mm x 55 mm with wall thickness 2.0 mm (? 0.2mm), corners of the door frame to be mitred cut and jointed with plastic brackets and stainless steel screws, reinforcing hinge side vertical of the frames with PVC profile of Size 28 mm x 30 mm having wall thickness 2 mm (? 0.2 mm), including providing & fixing 3 nos of 125 mm long stainless steel hinges to the frame, fixing the frame with jamb with required number & size of anchor dash fastners, all complete as per manufacturer's specification and direction of Engineer-in-charge.						
	door						
		1.000	6.500				6.500
	Total						**6.500**
						Total Quantity in metre	**6.500**
1.015	9.142.2						
	35 mm thick factory made Solid panel PVC Door shutter, made out of single piece extruded solid PVC (±0.2 mm) thick, having styles & rails (except lock rail) of size 95 mmx 35 mm x 5 mm, out of which 75 mm shall be flat and 20 mm shall be tapered (on both side), having one side thickness of 15 mm integrally extruded on the hinges side of the profile for better screw holding power, including reinforcing with MS tube of size 40 mm x 20 mm x 1 mm, joints of styles & rails to be mitered cut & joint with the help of PVC solvent cement, self driven self tapping screws & M.S. rectangular pipes bracket of size 190 mm x 100 mm of cross section size 35 mm x 17 mm s 1 mm at each corner. Single piece extruded 5 mm thick solid PVC Lock rail of size 115 mm x 35 mm x 35 mm, out of which 95 mm to be flat and 20 mm to be tapered at both ends, having 15 mm solid core in middle of rail section integrally extruded, fixing the styles & rails with the help of solvent and self driven self tapping screws of 125 mm x 11 mm, including providing 5 mm Single piece solid PVC extruded sheet inserted in the door as panel, all complete as per manufacturer's specification and direction of Engineer-in-charge.Decorative finish (wood grained finish)						
	door						
		1.000	1.000		2.100		2.100
	Total						**2.100**
						Total Quantity in sqm	**2.100**
1.016	9.147.5						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing factory made uPVC white colour casement/casement cum fixed glazed windows comprising of uPVC multi-chambered frame, sash and mullion (where ever required) extruded profiles duly reinforced with 1.60 +/- 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), uPVC extruded glazing beads of appropriate dimension, EPDM gasket, stainless steel (SS 304 grade) friction hinges, zinc alloy (white powder coated) casement handles, G.I fasteners 100 x 8 mm size for fixing frame to finished wall, plastic packers, plastic caps and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, mullion (if required) shall be also fusion welded including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, all complete as per approved drawing & direction of Engineer-in-Charge. (Single / double glass panes and silicon sealant shall be paid separately) Note: For uPVC frame, sash and mullion extruded profiles minus 5% tolerance in dimension i.e. in depth & width of profile shall be acceptable.Casement window double panels with S.S. friction hinges (350 x 19 x 1.9 mm) made of (big series)frame 67 x 60 mm & sash / mullion 67 x 80 mm both having wall thickness of 2.3 ± 0.2 mm and single glazing bead/ double glazing bead of appropriate dimension. (Area of window above 1.50 sqm).						
	window						
		1.000	2.000		1.500		3.000
	Total						**3.000**
						Total Quantity in sqm	**3.000**
1.017	9.7.7.1						
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick: Float glass panes4 mm thick glass pane						
	window						
		4.000	0.400		1.400		2.240
	Total						**2.240**
						Total Quantity in sqm	**2.240**
1.018	9.100.2						
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm						
	door						
		2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.019	9.97.3						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm						
	door						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.020	50.9.15.2						
	Supplying and fixing 300 mm Aluminium aldrop						
	for door						
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.021	13.7.2						
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:4 (1 cement : 4 fine sand)						
	plastering						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	Total						**448.730**
	pump house						
	long wall	2*2	6.000		3.000		72.000
	cross wall	2*2	5.600		3.000		67.200
	door	-1*2	1.000		2.100		-4.200
	window	-1*2	2.000		1.500		-6.000
	Total						**129.000**
						Total Quantity in sqm	**577.730**
1.022	13.15						
	20 mm cement plaster 1:2 (1 cement : 2 stone dust)						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Inside water tank						
	Floor of slab (excluding haunch)	1.000					1.000
	Vertical sides	1.000					1.000
	Haunchings	1.000					1.000
	Total						**3.000**
						Total Quantity in sqm	**3.000**
1.023	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	ceiling						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**151.640**
1.024	10.25.2						
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works						
	For Ladder						
	Ladder for (Stage height 12.45 m)	4.000	1000.000			1.000000	4000.000
	Total						**4000.000**
						Total Quantity in kg	**4000.000**
1.025	13.43.1						
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	painting						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	pump house-long wall	2*2	6.000		3.000		72.000
	do-cross wall	2*2	5.600		3.000		67.200
	do-door	-1*2	1.000		2.100		-4.200
	do-window	-1*2	2.000		1.500		-6.000
	Total						**577.730**
	painting ceilings						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**729.370**
1.026	13.60.1						
	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade:Two or more coats on new work						
	painting						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	pump house-long wall	2*2	6.000		3.000		72.000
	do-cross wall	2*2	5.600		3.000		67.200
	do-door	-1*2	1.000		2.100		-4.200

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	do-window	-1*2	2.000		1.500		-6.000
	Total						**577.730**
	painting ceiling						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**729.370**
1.027	50.18.9.9.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2						
	pipe line						
		150.000					150.000
	Total						**150.000**
						Total Quantity in metre	**150.000**
1.028	50.18.8.8.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 75 mm pipe 6 Kgf/cm2						
	pipe line						
		20.000					20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
1.029	18.17.5						
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :65 mm nominal bore						
	for supply lines						
		5.000					5.000
	Total						**5.000**
						Total Quantity in each	**5.000**
1.030	50.18.9.8.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	supply line						
		1000.000					1000.000
	Total						**1000.000**
						Total Quantity in metre	**1000.000**
1.031	50.18.7.4.2						
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall						
	pipe line						
		1.000	750.000				750.000
	Total						**750.000**
						Total Quantity in metre	**750.000**
1.032	18.17.2						
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :32 mm nominal bore						
	for supply lines						
		10.000					10.000
	Total						**10.000**
						Total Quantity in each	**10.000**
1.033	18.32.1						
	Constructing masonry chamber 30x30x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for stop cock, with C.I. surface box 100x100x75 mm (inside) with hinged cover fixed in cement concrete slab 1:2:4 mix (1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S (non modular) bricks of class designation 7.5						
	for inspection chamber						
		3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.034	50.18.9.21.4						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend						
	bend						
		10.000					10.000
	Total						**10.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in no	**10.000**
1.035	50.18.9.21.9						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling						
	socket						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
1.036	18.59.2						
	Providing and fixing C.I double acting air valve of approved quality with bolts, nuts, rubber insertion etc. complete (The tail pieces, tapers etc. if required will be paid separately):80 mm dia						
	air valve						
		3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.037	50.18.9.6.2						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2						
	pipe line						
		100.000					100.000
	Total						**100.000**
						Total Quantity in metre	**100.000**
1.038	50.18.9.21						
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Elbow						
	elbow						
		10.000					10.000
	Total						**10.000**
						Total Quantity in no	**10.000**
1.039	50.18.9.21.5						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee						
	tee						
		10.000					10.000
	Total						**10.000**
						Total Quantity in no	**10.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.040	18.15.2						
	Providing and fixing brass bib cock of approved quality :20 mm nominal bore						
	bib cock						
		20.000					20.000
	Total						**20.000**
						Total Quantity in each	**20.000**
1.041	18.60.1						
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore						
	water meter						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
2	Pile liners and miscellaneous items for piling						
2.001	12.22						
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.						
	6 mm liner 47.1 kg/m2						
		9.000	3.14*.606	47.1/1000	5.000		4.033
	Total						**4.033**
						Total Quantity in MT	**4.033**
2.002	OD1321/2022-2023						
	Driving down vertically M.s Liner already fabricated to the required depth by power winch and accessories including all hire charge of machinery , labour charges etc complete						
	6mm thk liner for piles						
		9.000	5.000				45.000
	Total						**45.000**
						Total Quantity in metre	**45.000**
2.003	OD1325/2022-2023						
	Supply, Fitting and Placing in position reinforcement in cages using HCR bar Reinforcement including cost of materials, labour charges, conveyance and placing the cages in bore holes providing precast cover blocks etc, complete as per Drawing and Technical Specificationsand as directed by Engineer in charge excluding cost of welding charges. Unit = 1 MT Taking output = 1 MT a) Material						
	for pile						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	pile 80kg/m3	9.000	25.000	3.140	0.600	0.080000	33.912
	pile cap 120kg/m3	1.000	6.400	6.400	0.750	0.120000	3.686
	rounding	1.000	0.967				0.967
	Total						**38.565**
						Total Quantity in tonne	**38.565**
2.004	12.23.3						
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm						
	Piles						
		9.000	25.000				225.000
	Total						**225.000**
						Total Quantity in metre	**225.000**
3	Construction of Sump						
3.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	sump						
		1.000	6.600	6.600	1.500		65.340
	Total						**65.340**
						Total Quantity in cum	**65.340**
3.002	60.7.4						
	DR PACKING FOR APRONS - Rough stone dry packing for apron with good quality blasted rubble including packing to compactness to lines levels, cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site						
	sump						
		1.000	6.600	6.600	0.450		19.602
	Total						**19.602**
						Total Quantity in cum	**19.602**
3.003	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	for sump						
	foundation	1.000	6.600	6.600	0.150		6.534

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**6.534**
						Total Quantity in cum	**6.534**
3.004	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	for sump						
	base slab	4.000	6.600		0.150		3.960
	Total						**3.960**
						Total Quantity in sqm	**3.960**
3.005	5.9.2						
	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.						
	for sump						
	side wall inner	4.000	5.600		2.000		44.800
	side wall inner	4.000	2.700		2.000		21.600
	side wall outer	8.000	2.700		2.000		43.200
	side wall edges	8.000	1.000		2.000		16.000
	Total						**125.600**
						Total Quantity in sqm	**125.600**
3.006	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	for sump						
	covering slab	2.000	6.300	2.700			34.020
	Total						**34.020**
						Total Quantity in sqm	**34.020**
3.007	5.1.2						
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size						
	for sump						
	bed slab	1.000	6.300	6.300	0.200		7.938
	rounding	1.000	0.062				0.062
	Total						**8.000**
						Total Quantity in cum	**8.000**
3.008	5.2.2						

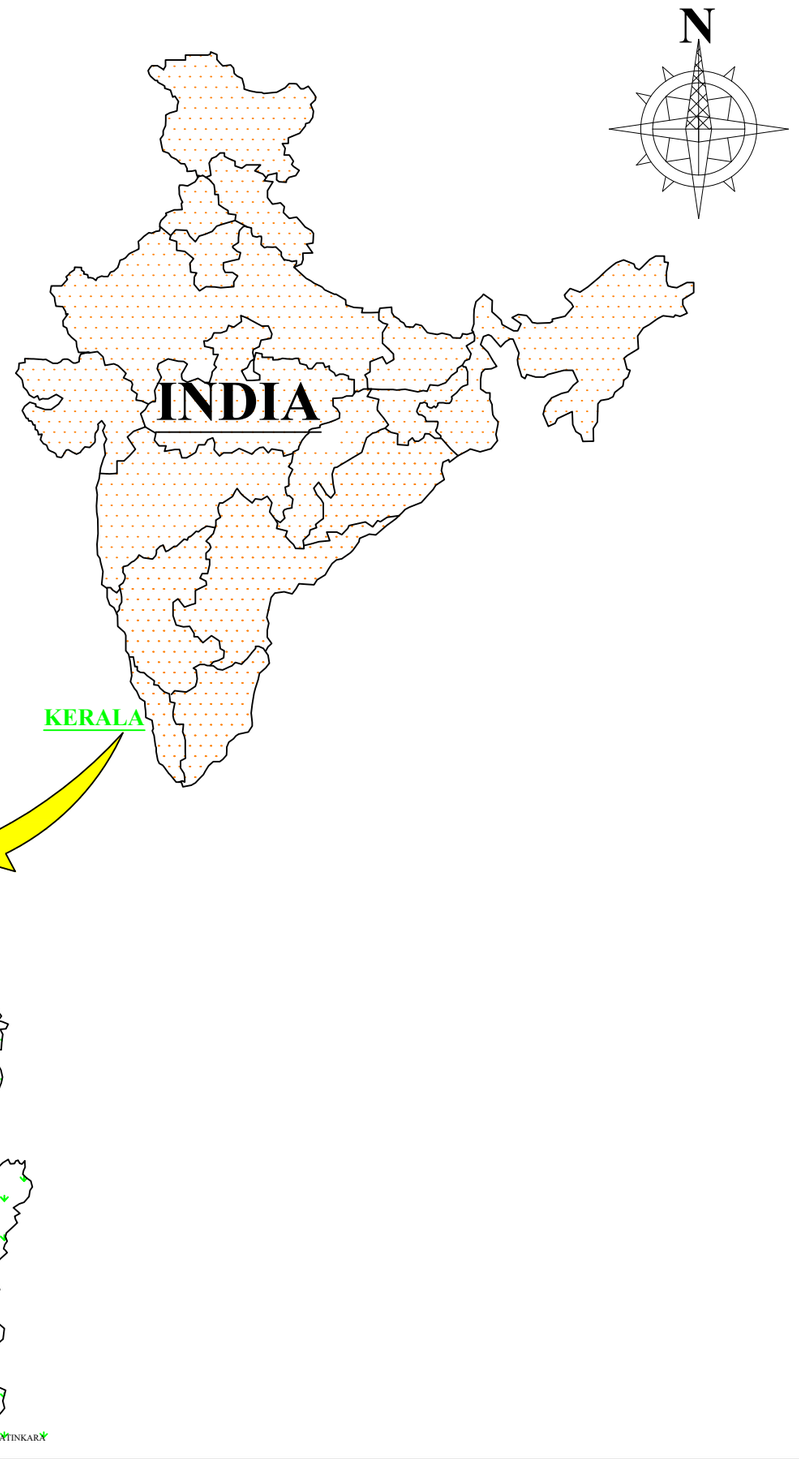
Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)						
	for sump						
	Side walls	8.000	2.700	0.200	2.000		8.640
	do-projections	8.000	0.350	0.350	2.000		1.960
	Side wall inner	1.000	5.600	0.200	2.000		2.240
	rounding	1.000	0.160				0.160
	Total						**13.000**
						Total Quantity in cum	**13.000**
3.009	5.3						
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).						
	for sump						
	covering slab	1.000	6.300	6.300	0.150		5.954
	rounding	1.000	0.046				0.046
	Total						**6.000**
						Total Quantity in cum	**6.000**
3.010	5.22.1						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelMild steel and Medium Tensile steel bars						
	for sump						
	For bed slab-80kg/m3	1.000	8.000			80.000000	640.000
	Total						**640.000**
						Total Quantity in kg	**640.000**
3.011	5.22A.1						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Mild steel and Medium Tensile steel bars						
	for sump						
	For side wall-120kg/m3	1.000	13.000			120.000000	1560.000
	For covering slab-100kg/m3	1.000	6.000			100.000000	600.000

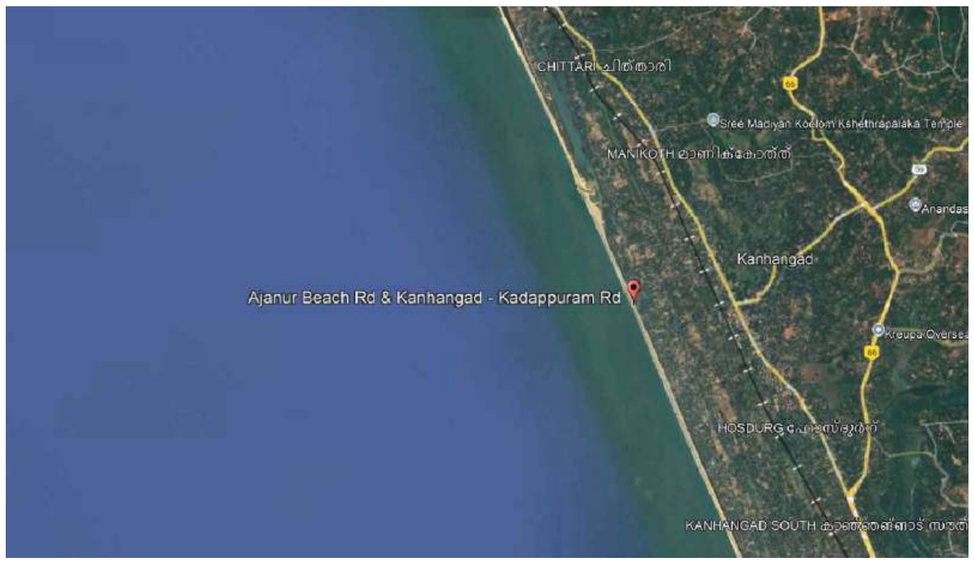
Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**2160.000**
						Total Quantity in kilogram	**2160.000**
3.012	50.13.1						
	9 mm cement plastering of mix : 1:3 (1 cement : 3 fine sand) including all cost of materials, labour charges etc complete						
	for sump						
	side walls outside	8.000	2.700		2.000		43.200
	do-projections	8.000	1.000		2.000		16.000
	Total						**59.200**
						Total Quantity in sqm	**59.200**
3.013	13.9.1						
	Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster						
	for sump						
	side walls inside	4.000	5.600		2.000		44.800
	side walls inside	4.000	2.700		2.000		21.600
	Total						**66.400**
						Total Quantity in sqm	**66.400**
3.014	50.18.9.19.2						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 m dia 4 Kgf/cm2 - External work - Exposed on wall						
	for sump						
		1.000	10.000				10.000
	Total						**10.000**
						Total Quantity in metre	**10.000**
3.015	50.18.9.8.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2						
	for sump						
		1.000	50.000				50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
3.016	50.18.9.18.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for sump						
		1.000	50.000				50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
3.017	50.18.7.6.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing . This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 6 Kgf/cm2 - Internal work- Exposed on wall						
	for sump						
		1.000	20.000				20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
3.018	50.18.9.6.2						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2						
	for sump						
		1.000	20.000				20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
3.019	50.18.9.21.4						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend						
	for sump						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
3.020	50.18.9.21.5						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee						
	for sump						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
3.021	50.18.9.21.8						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75 mm dia End cap						
	for sump						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
3.022	50.18.9.21.9						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling						
	for sump						
		2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
3.023	18.37.1						
	Constructing masonry chamber 60x45x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for water meter complete with C.I double flap surface box 400x200x200 mm (inside) with locking arrangement and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 grades stone aggregate 20 nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S. (non modular) bricks of class designation 7.5						
	Inspection Chamber						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
3.024	18.60.1						
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore						
	water meter						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**

DRAWINGS

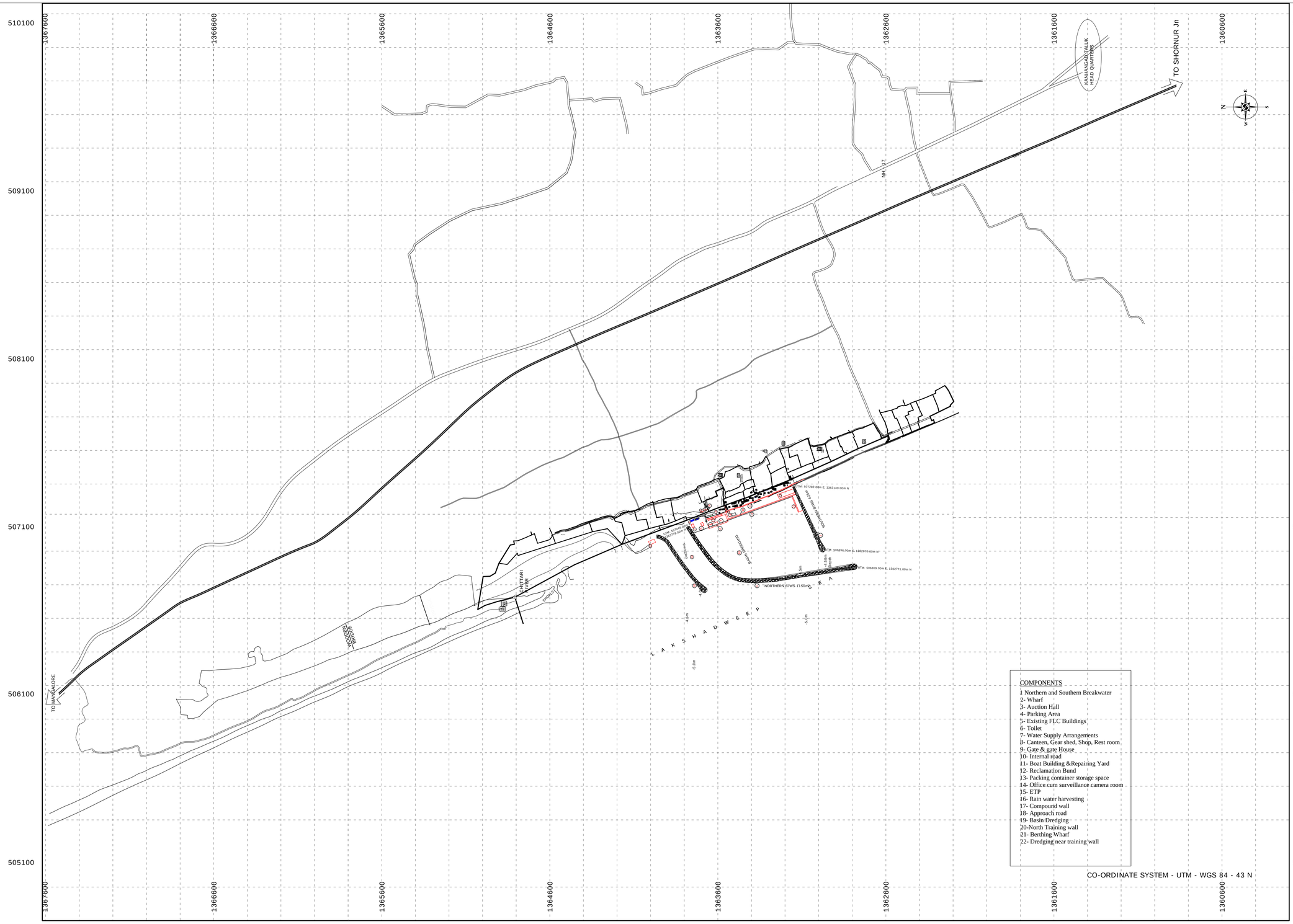




KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	01/24/AJNR	**ASSISTANT ENGINEER:** SIGNATURE:	**ASSISTANT EXECUTIVE ENGINEER:** SIGNATURE:
		DRAWN:			
TYPE:		**REVISION**		**EXECUTIVE ENGINEER:** SIGNATURE:	**SUPERINTENDING ENGINEER:** SIGNATURE: / **CHIEF ENGINEER:** SIGNATURE:
TITLE:	LOCATION MAP				



KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	2/ 24 / AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:8000		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	LAYOUT				

506100

507100

508100

1363600

1362600

N

W

E

S

LAKSHADWEEP SEA

-4.5m

-5.0m

-4.0m

DREDGING

BASIN DREDGING

1150 m

NORTHERN B/WS 1150m

-4.5m

-5.0m

-4.50m Depth

UTM: 506809.00m E, 1362771.00m N

SOUTHERN B/WS 425m

UTM: 506896.00m E, 1362970.00m N

UTM: 507045.00m E, 1363778.00m N

UTM: 507282.00m E, 1363149.00m N

Crescent school
Ajanur kadapuram

Sri Kurumba

Rahmaniya Masjid

Anganvadi

COMPONENTS

1 Northern and Southern Breakwater
2- Wharf
3- Auction Hall
4- Parking Area
5- Existing FLC Buildings
6- Toilet
7- Water Supply Arrangements
8- Canteen, Gear shed, Shop, Rest room
9- Gate & gate House
10- Internal road
11- Boat Building &Repairing Yard
12- Reclamation Bund
13- Packing container storage space
14- Office cum surveillance camera room
15- ETP
16- Rain water harvesting
17- Compound wall
18- Approach road
19- Basin Dredging
20-North Training wall
21- Berthing Wharf
22- Dredging near training wall

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	2(a)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:2500		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	PROPOSED LAYOUT				

506100

507100

508100

1363600

1362600

N

W

E

S

COMPONENTS

1 Northern and Southern Breakwater
2- Wharf
3- Auction Hall
4- Parking Area
5- Existing FLC Buildings
6- Toilet
7- Water Supply Arrangements
8- Canteen, Gear shed, Shop, Rest room
9- Gate & gate House
10- Internal road
11- Boat Building &Repairing Yard
12- Reclamation Bund
13- Packing container storage space
14- Office cum surveillance camera room
15- ETP
16- Rain water harvesting
17- Compound wall
18- Approach road
19- Basin Dredging
20-North Training wall
21- Berthing Wharf
22- Dredging near training wall

DREDGING

-4.0m

BASIN DREDGING

1150 m

NORTHERN B/WS 1150m

-4.5m

-4.50m
Depth

UTM: 506809.00m E, 1362771.00m N

UTM: 507045.00m E, 1363778.00m N

UTM: 507282.00m E, 1363149.00m N

SOUTHERN B/WS 425m

UTM: 506896.00m E, 1362970.00m N

Crescent school
Aseruf kadapuram

Sri
kurumba

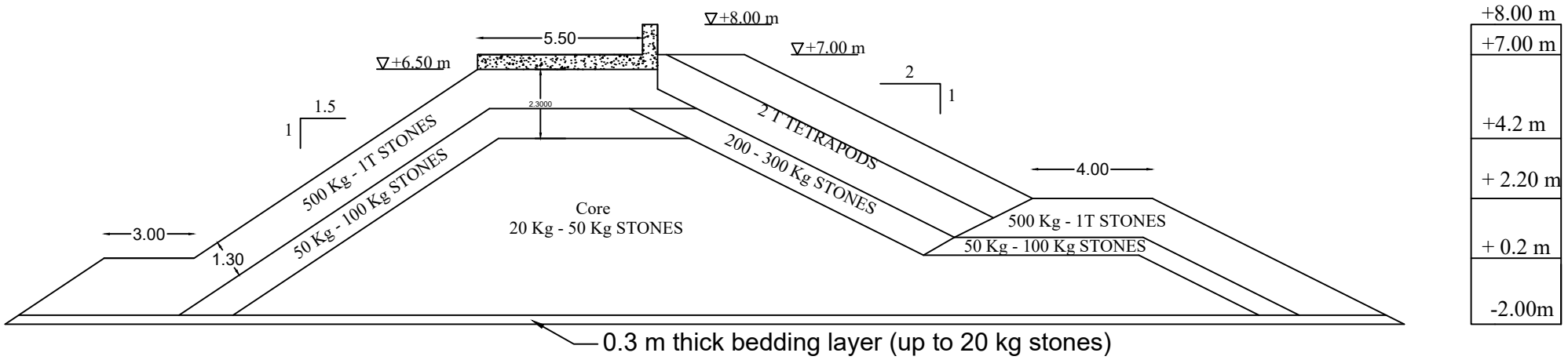
Rahmaniya
Masjid

Anganvadi

KERALA STATE HARBOUR
ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	2(b) /24/ AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:2500		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	LAYOUT WITH CONTOUR				



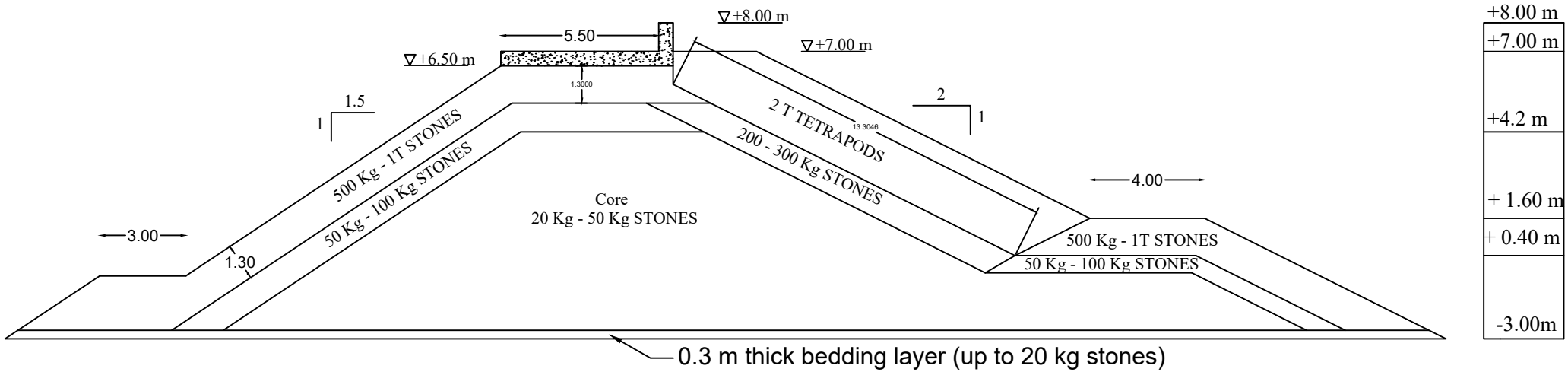
Trunk section at -2.0 m Bed Level

5 - 10kg Stones	13.84 sqm
20 - 50kg Stones	112.86 sqm
50 - 100kg Stones	24.19 sqm
200 - 300kg Stones	10.29 sqm
500 Kg - 1T Stones	47.50 sqm
2 T Tetrapods	11.07 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO:	3(a)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:200		
TYPE:	Break water and river training	REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE / CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -2.0 m bed level				



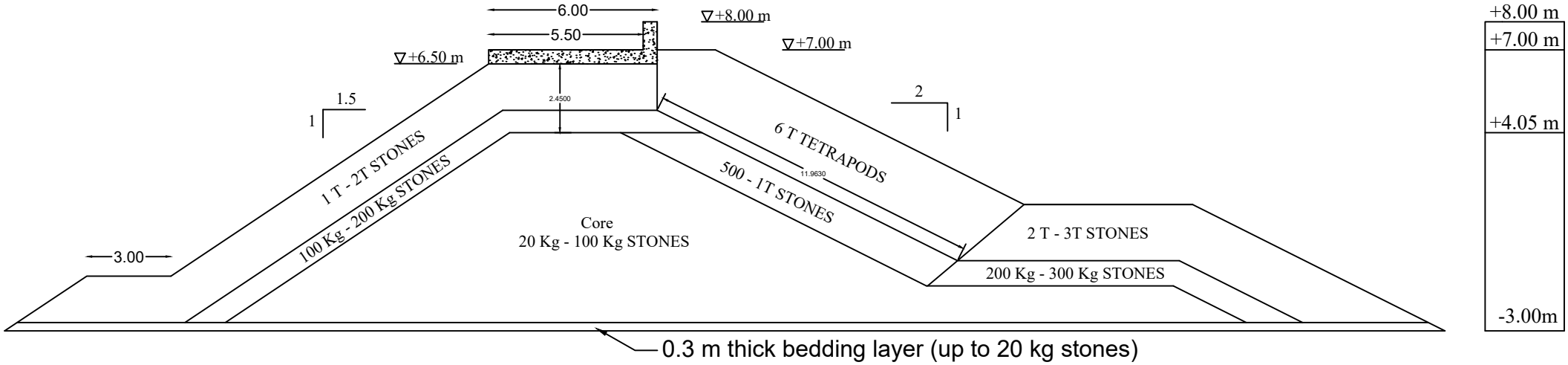
Trunk section at -3.0 m Bed Level

5 - 10kg Stones	14.89 sqm
20 - 50kg Stones	141.63 sqm
50 - 100kg Stones	25.99 sqm
200 - 300kg Stones	12.52 sqm
500 Kg - 1T Stones	49.84 sqm
2 T Tetrapods	13.30 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO:	3(b)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:200		
TYPE:	Break water and river training	REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE / CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -3.0 m bed level				



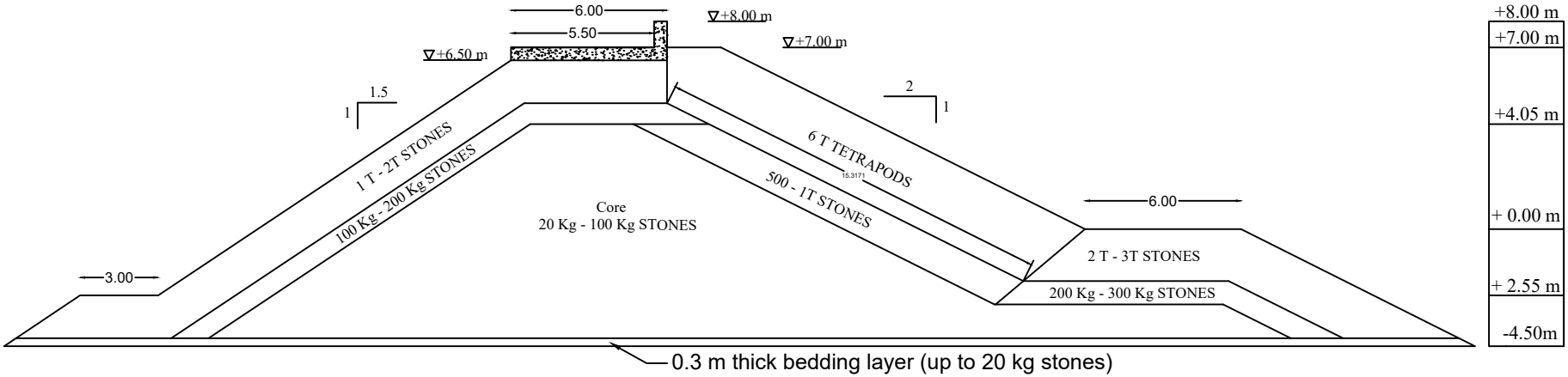
Trunk section at -3.0 m Bed Level

5 - 10kg Stones	15.24 sqm
20 - 100kg Stones	117.84 sqm
10 - 200kg Stones	15.26 sqm
200 - 300kg Stones	11.03 sqm
500 Kg - 1T Stones	14.45 sqm
1T - 2 T Stones	39.35 sqm
2T - 3 T Stones	28.21 sqm
6 T Tetrapods	12.00 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO:	3(c)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:200		
TYPE:	Break water and river training	REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE / CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -3.0 m bed level				



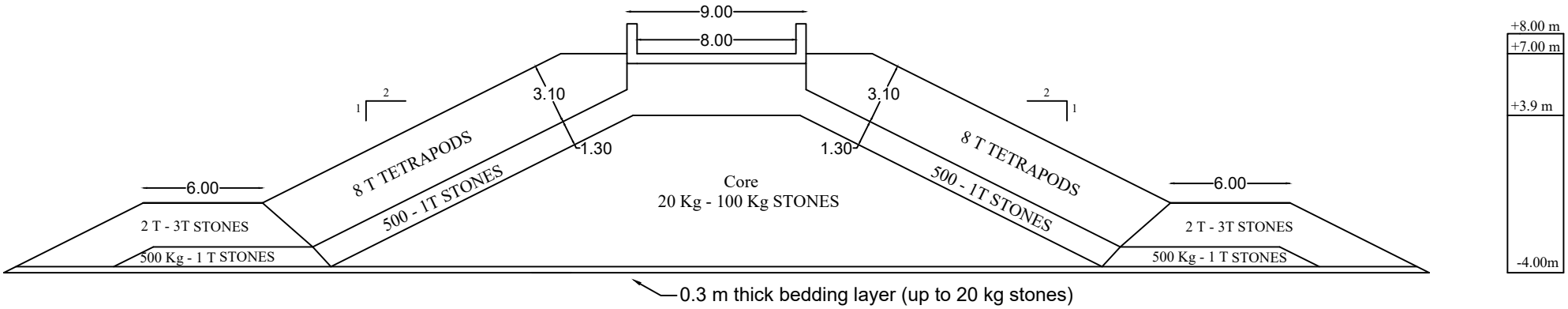
Trunk section at -4.5 m Bed Level

5 - 10kg Stones	16.81 sqm
20 - 100kg Stones	163.28 sqm
10 - 200kg Stones	17.42 sqm
200 - 300kg Stones	11.03 sqm
500 Kg - 1T Stones	18.89 sqm
1T - 2 T Stones	43.81 sqm
2T - 3 T Stones	28.21 sqm
6 T Tetrapods	15.31 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO: 3(d)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:250			
TYPE:	Break water and river training	REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -4.5 m bed level				



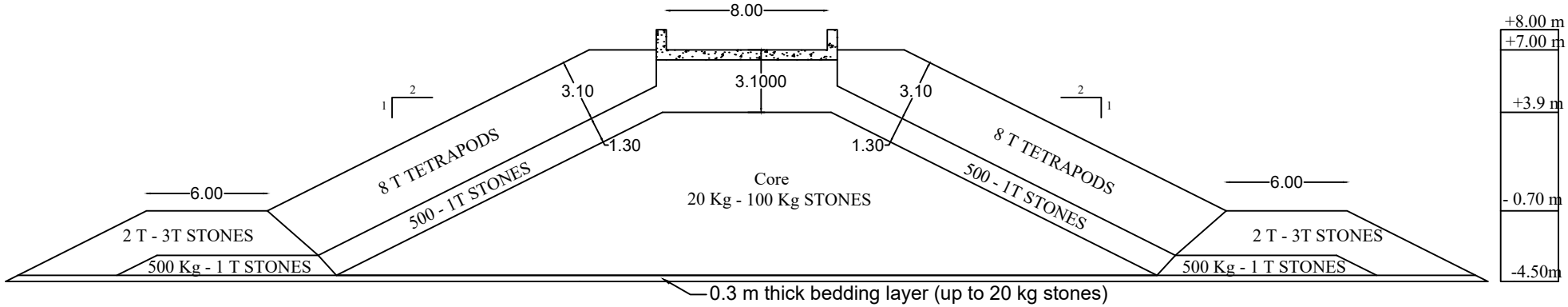
Round Head section at -4.0 m Bed Level

5 - 10kg Stones	21.32 sqm
20 - 100kg Stones	179.26 sqm
500 Kg - 1T Stones	86.99 sqm
2T - 3 T Stones	51.48 sqm
8 T Tetrapods	17.66 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO: 3(e)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:300			
TYPE:	Break water and river training	REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -4.0 m bed level				



Round Head section at -4.5 m Bed Level

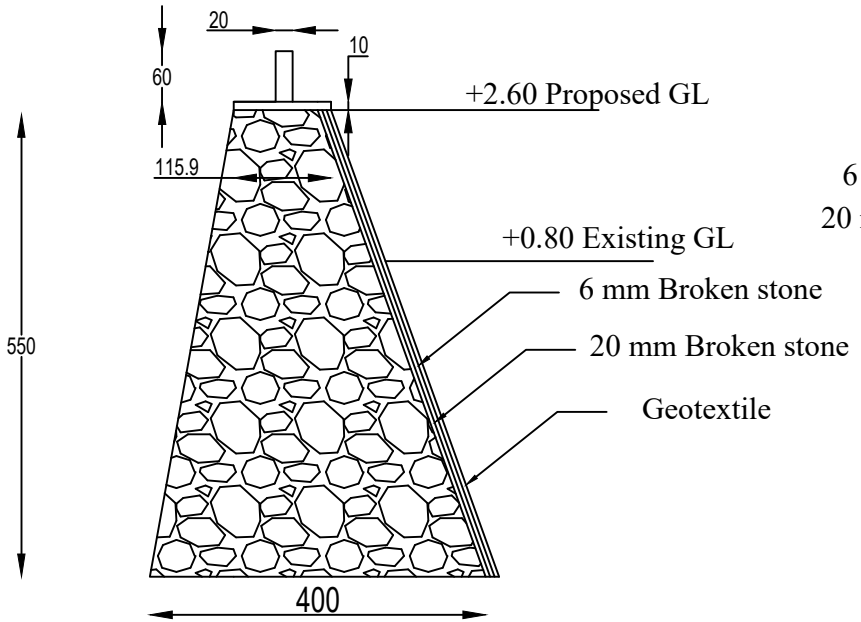
5 - 10kg Stones	21.92 sqm
20 - 100kg Stones	199.15 sqm
500 Kg - 1T Stones	89.90 sqm
2-3 T Stones	51.48 sqm
8 T Tetrapods	20.19 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

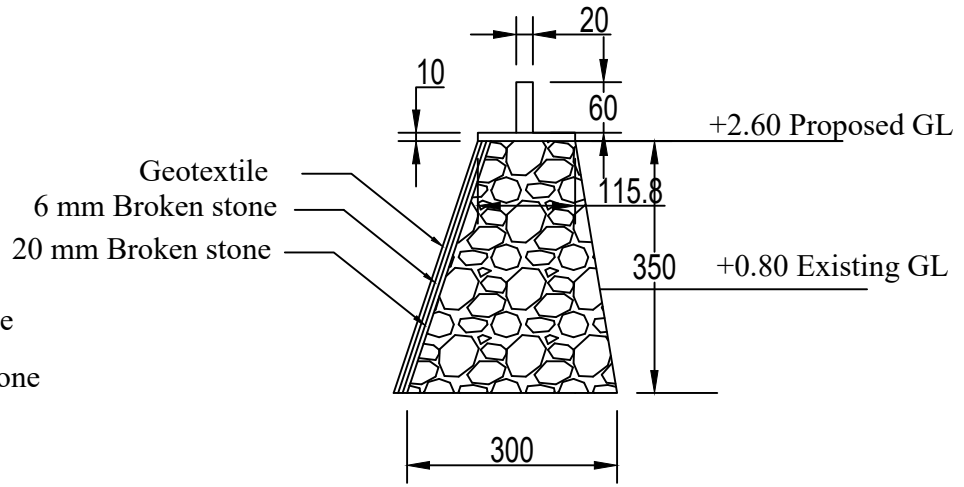
NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO: 3(f)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:300			
TYPE:	Break water and river training	REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -4.5 m bed level				

CROSS SECTION OF RECLAMATION BUND ALONG THE BASIN



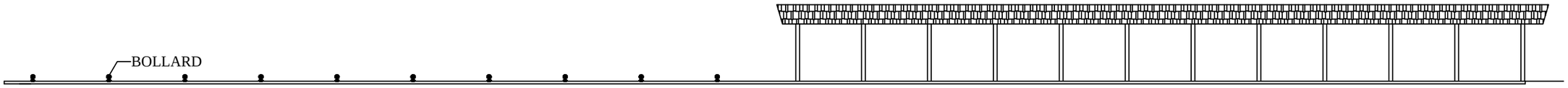
CROSS SECTION OF RECLAMATION BUND NEAR THE RIVER TRAINING AREA



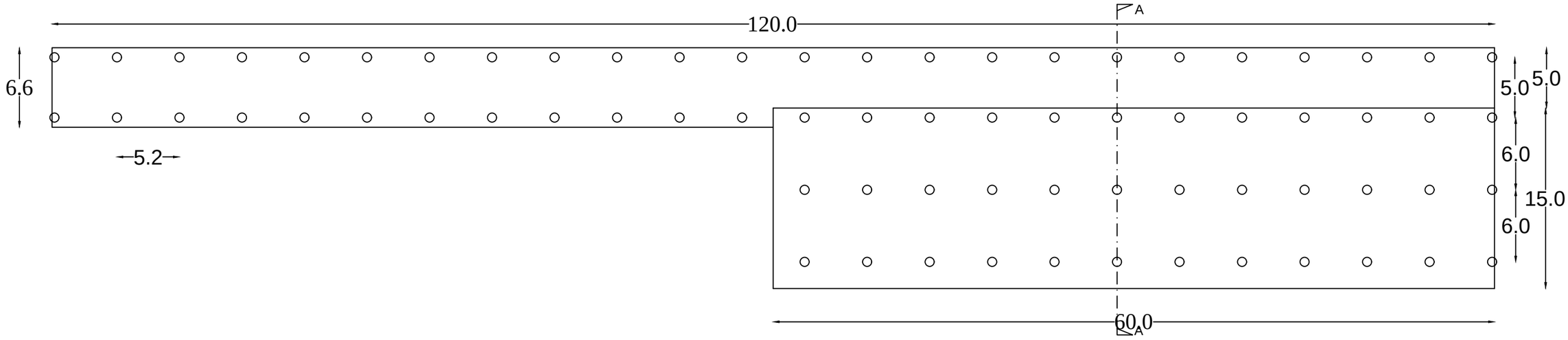
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

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TITLE:	DREDGING AND CONSTRUCTION OF RECLAMATION BUND				



FRONT ELEVATION

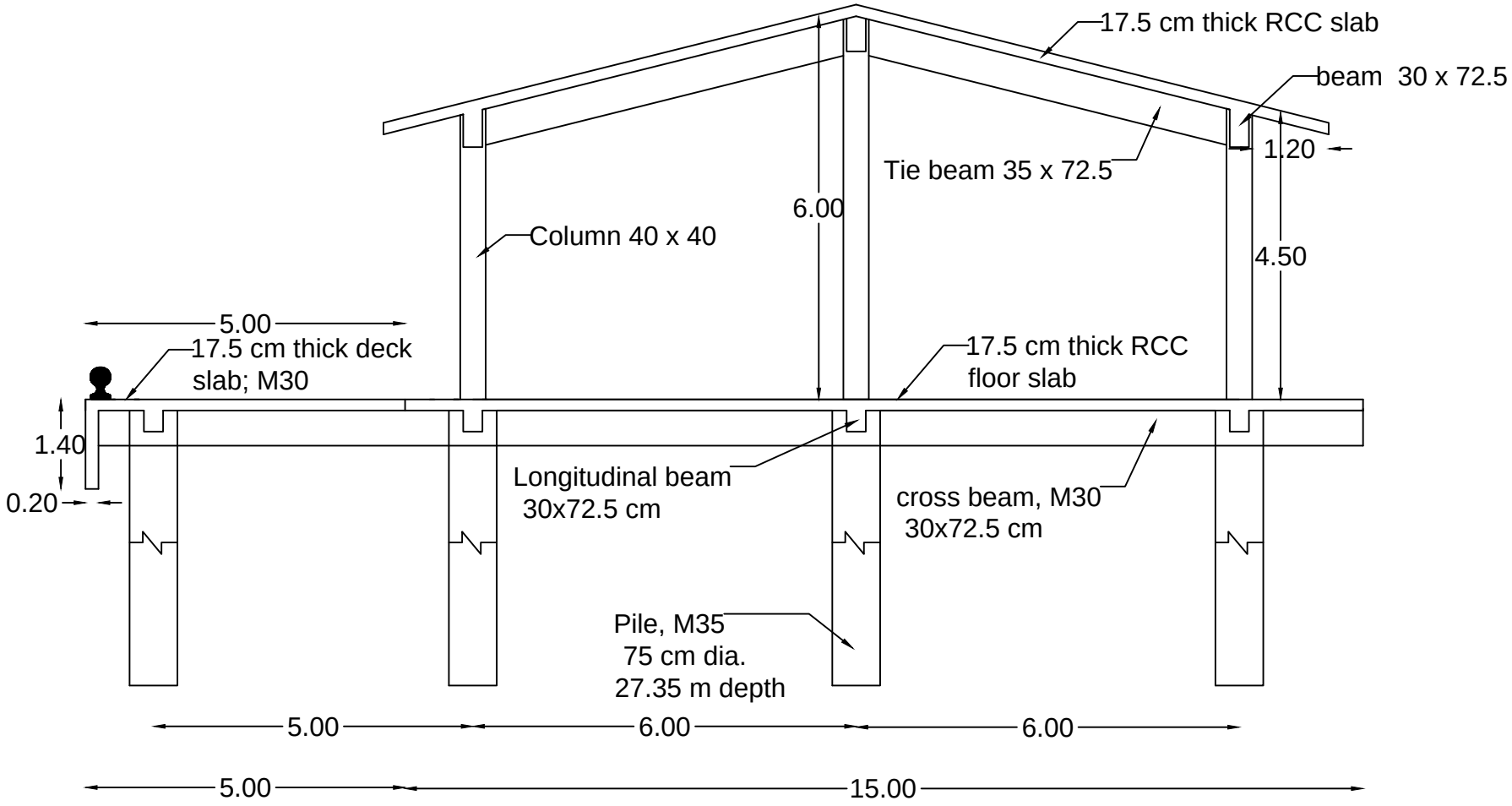


PLAN OF HARBOUR

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	5(a) /24 /AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
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TITLE:	WHARF AND AUCTION HALL				

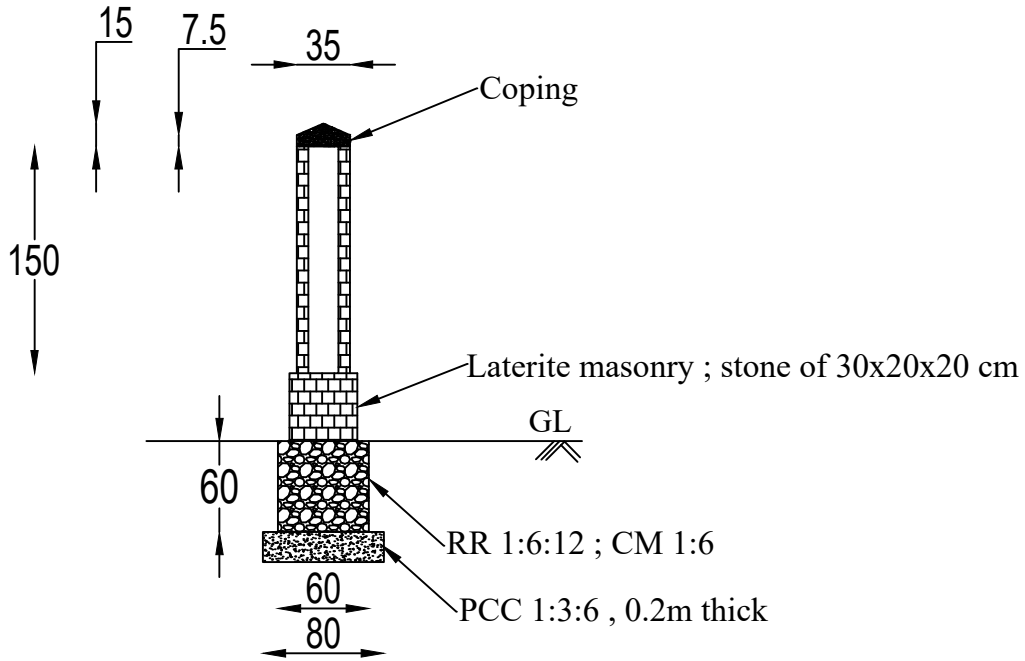


SECTION AA

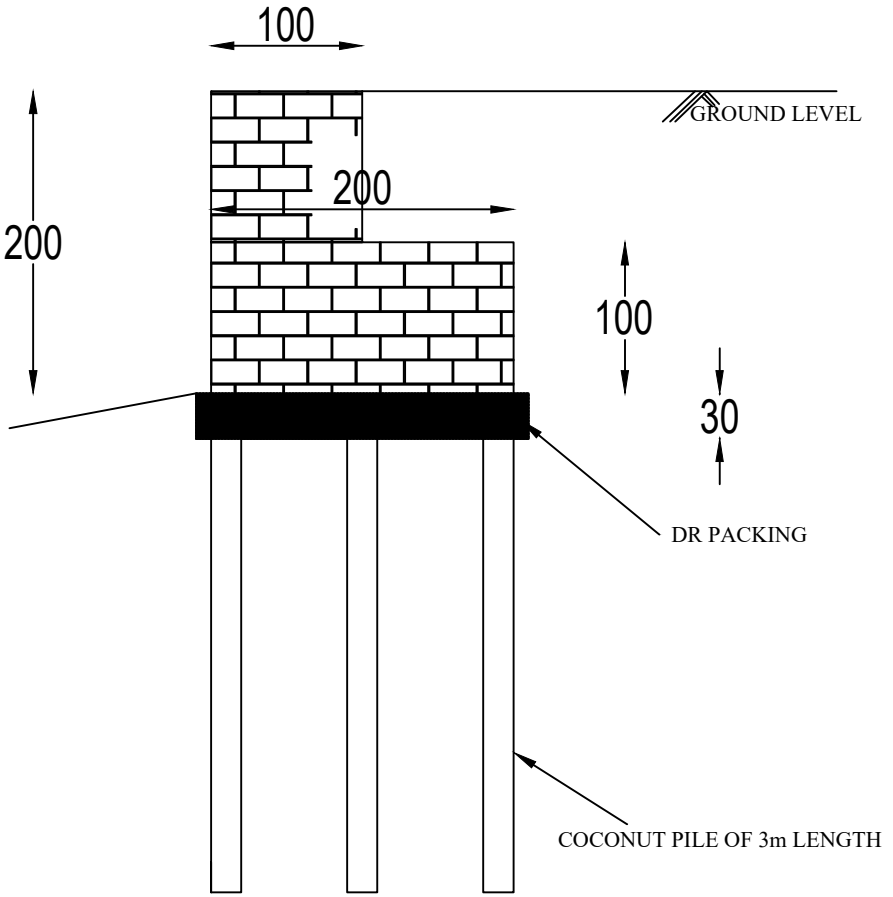
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	5(b) /24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
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TITLE:	WHARF AND AUCTION HALL				



CROSS SECTION OF COMPOUND WALL

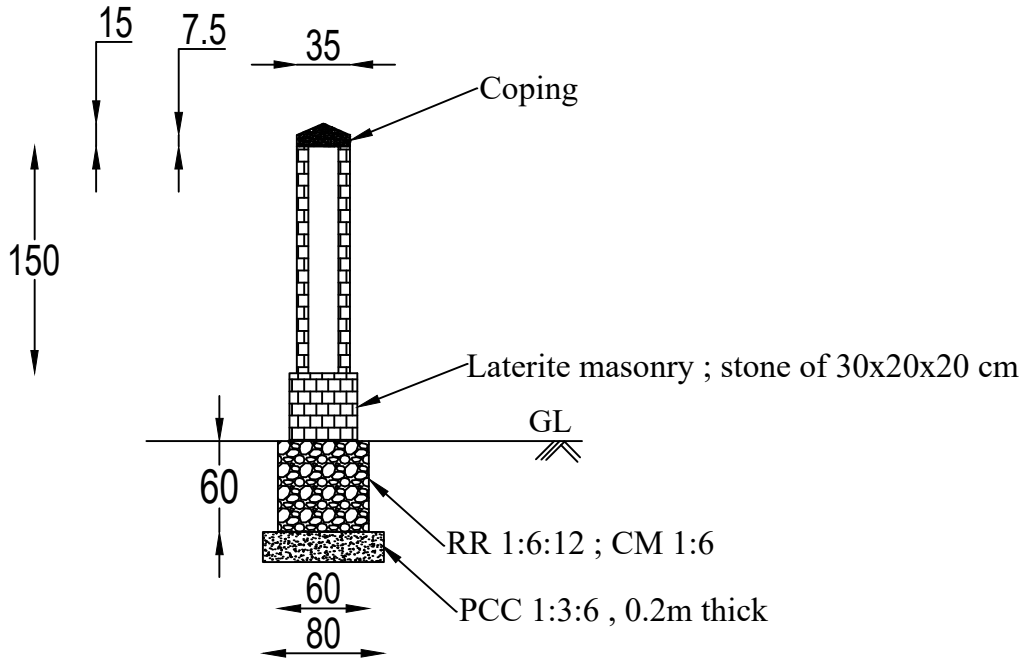


SIDE PROTECTION

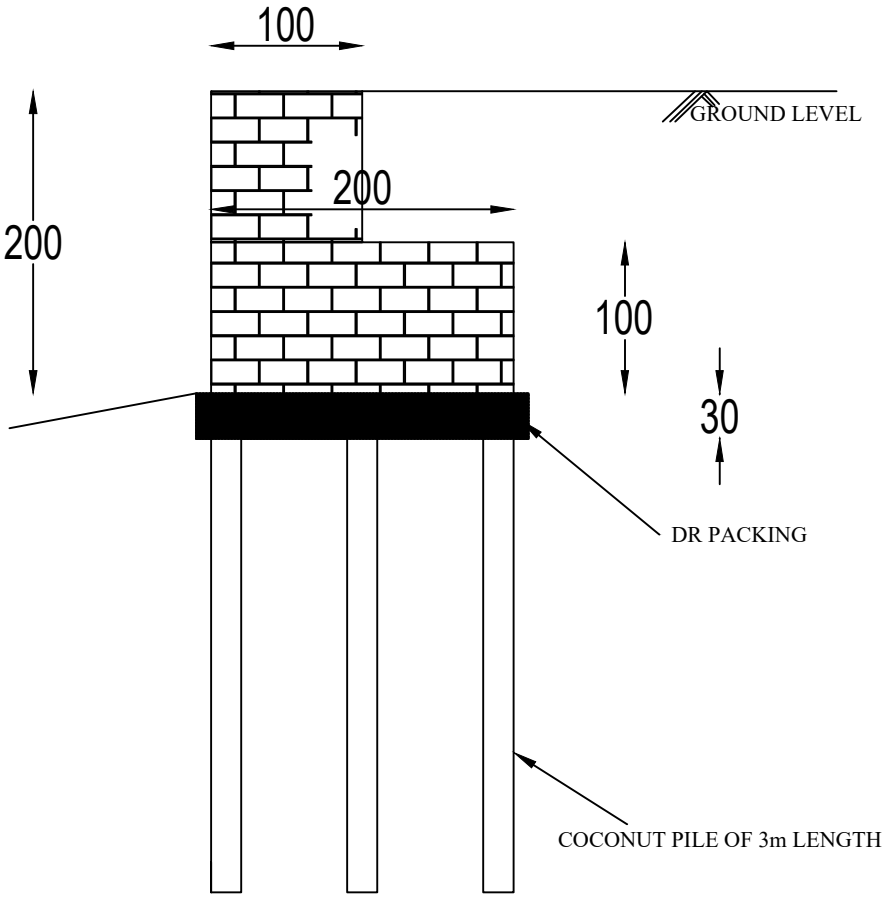
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

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TITLE:	COMPOUND WALL AND SIDE PROTECTION				



CROSS SECTION OF COMPOUND WALL

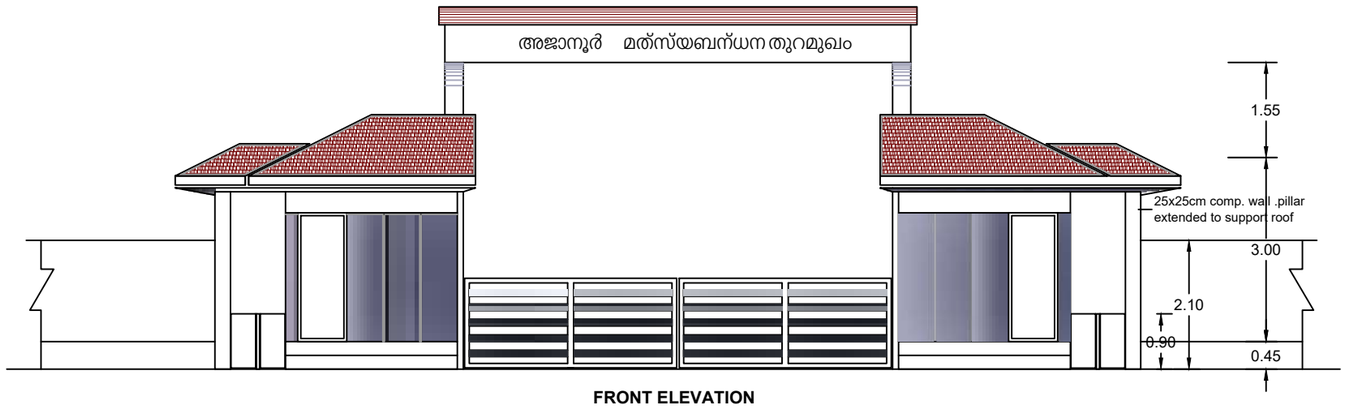


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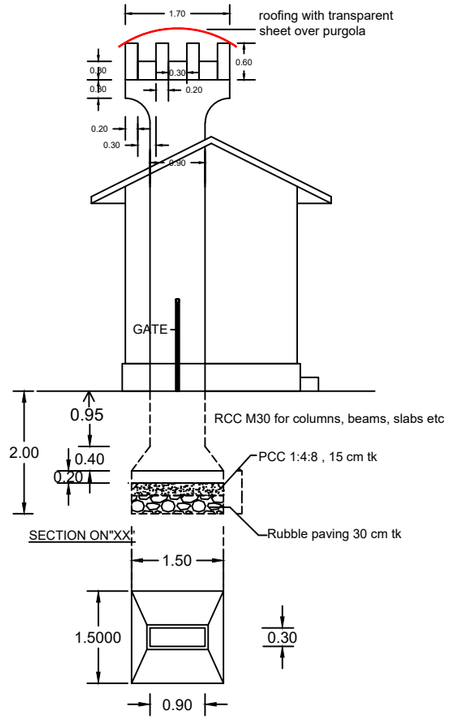
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

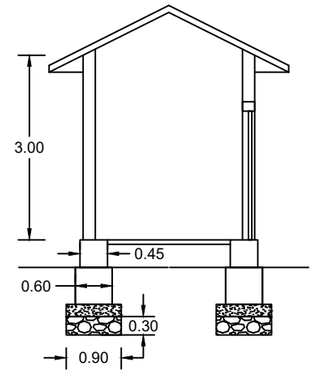
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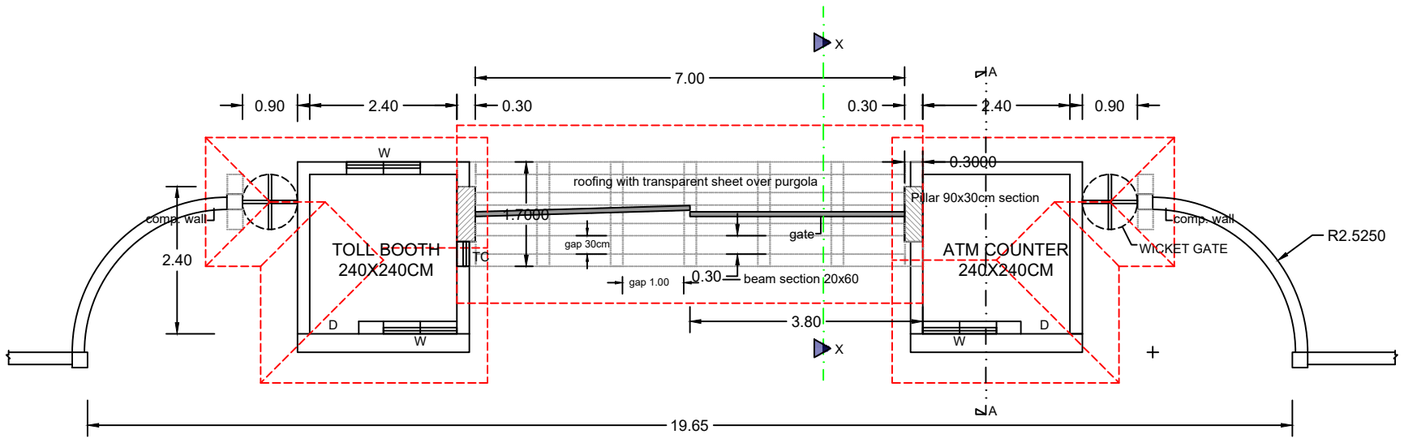
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TITLE:	COMPOUND WALL AND SIDE PROTECTION				



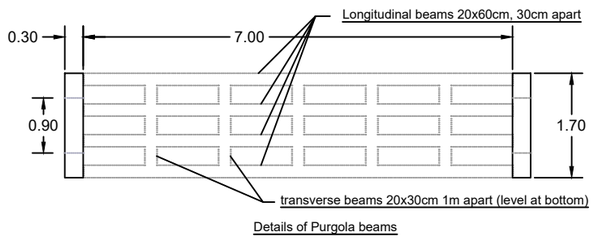
FRONT ELEVATION







PLAN OF GATE HOUSE



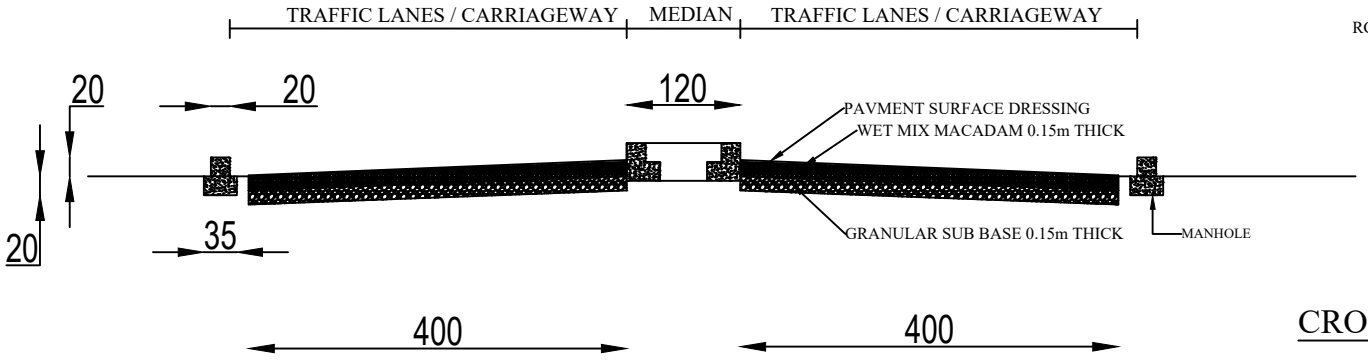
Details of Purgola beams

ALL DIMENSIONS ARE IN M

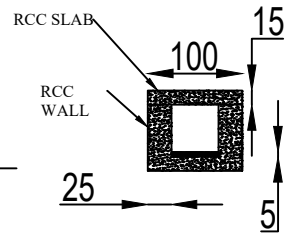
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	08 / 24 / AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
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TITLE:	GATE AND GATE HOUSE				



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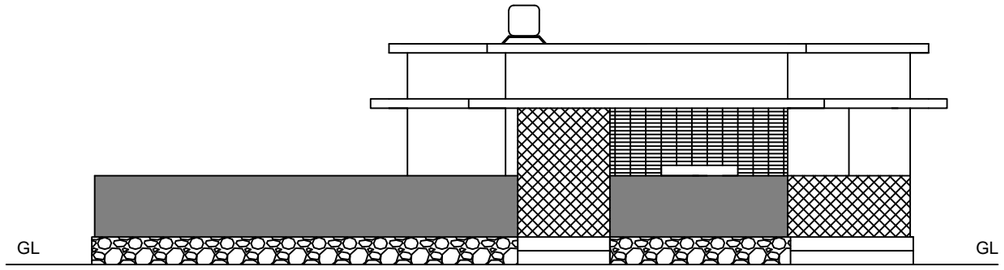


CROSS SECTION OF DRAINAGE

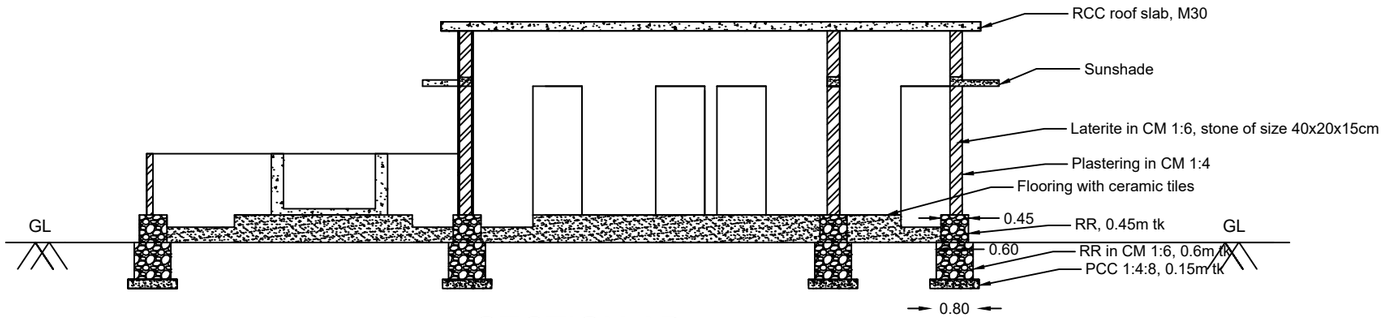
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

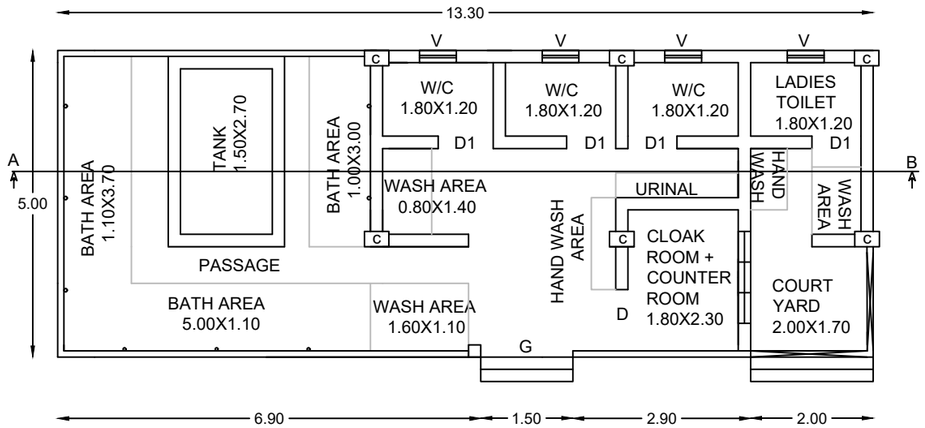
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TITLE:	INTERNAL ROAD, PARKING AREA & DRAINAGE FACILITY				



ELEVATION



SECTION AB



PLAN

INDEX

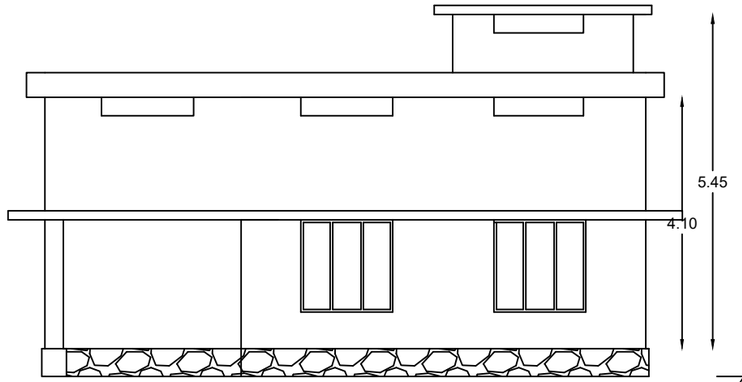
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DOOR	D1	= 0.80X2.10
WINDOW	W	= 1.50X1.50
VENTILATOR	V	= 0.60X0.90

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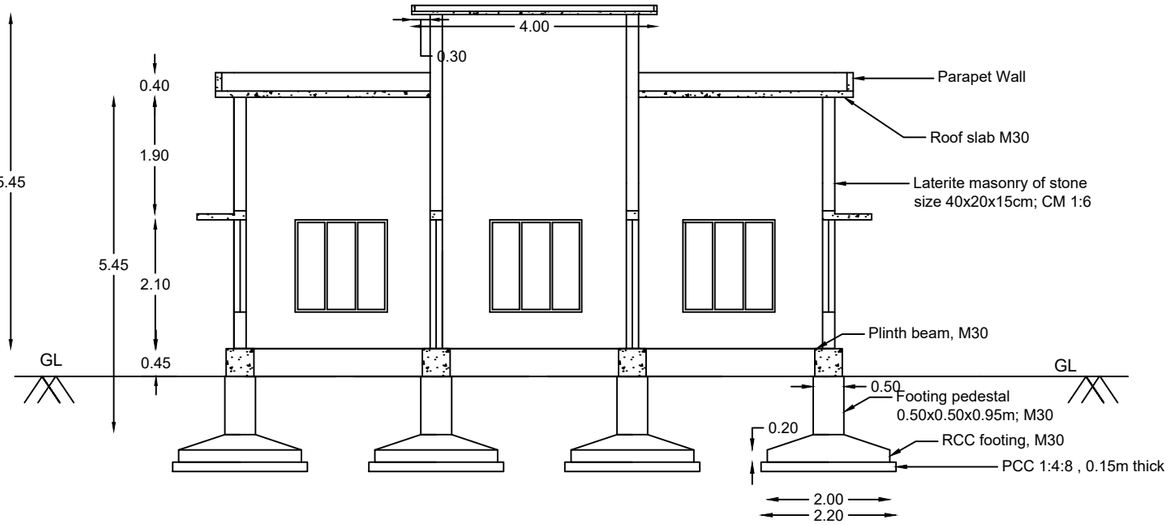
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

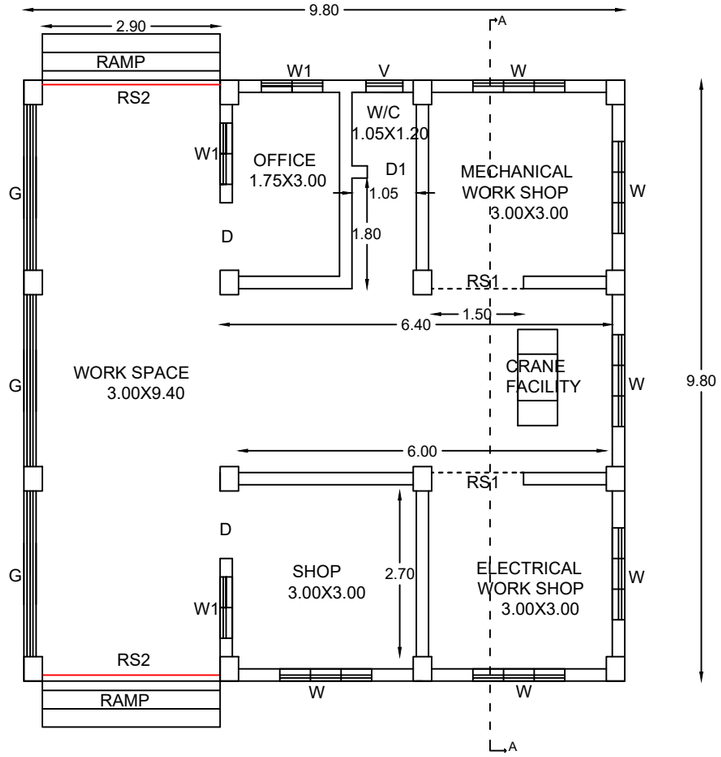
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TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	TOILET BLOCK				



ELEVATION



SECTION AA



PLAN

INDEX

DOOR	D =110X210
DOOR	D1 = 80X210
GRILL	G = 280X410
VENTILATOR	V = 60X60
ROLLING SHUTTER RS1 = 150X370	
ROLLING SHUTTER RS2 = 290X370	

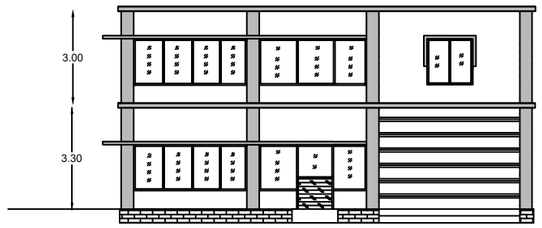
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KERALA STATE HARBOUR ENGINEERING DEPARTMENT

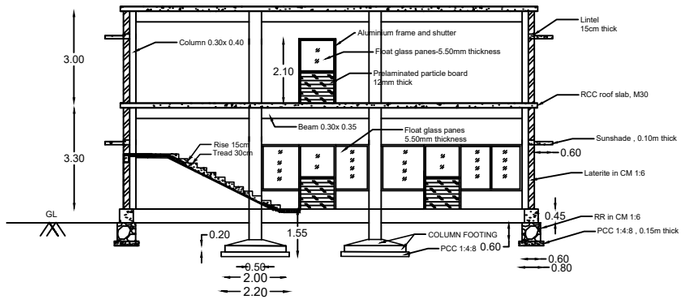
NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	11 /24 /AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
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TITLE:	WORKSHOP BUILDING				

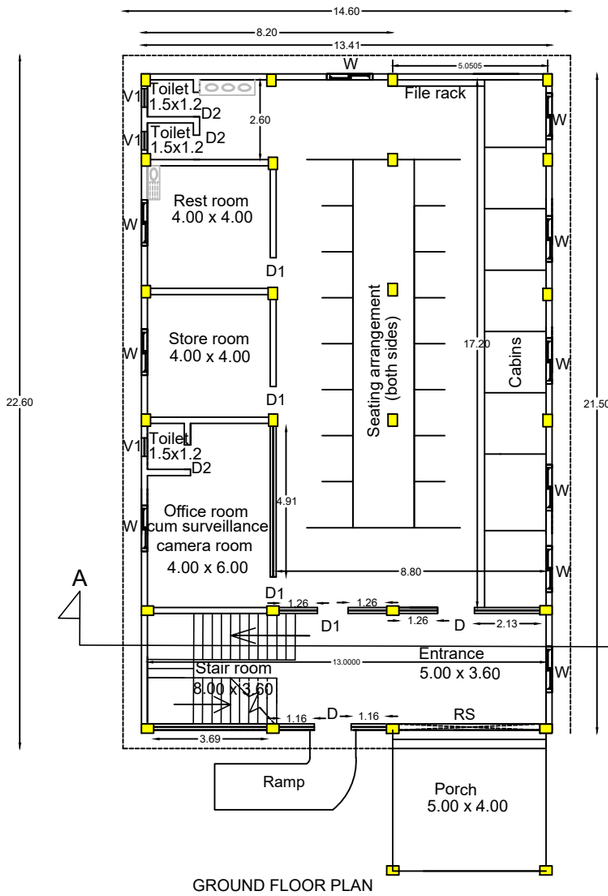
Ajanur Fishing Harbour - Construction of office room cum harbour surveillance camera room



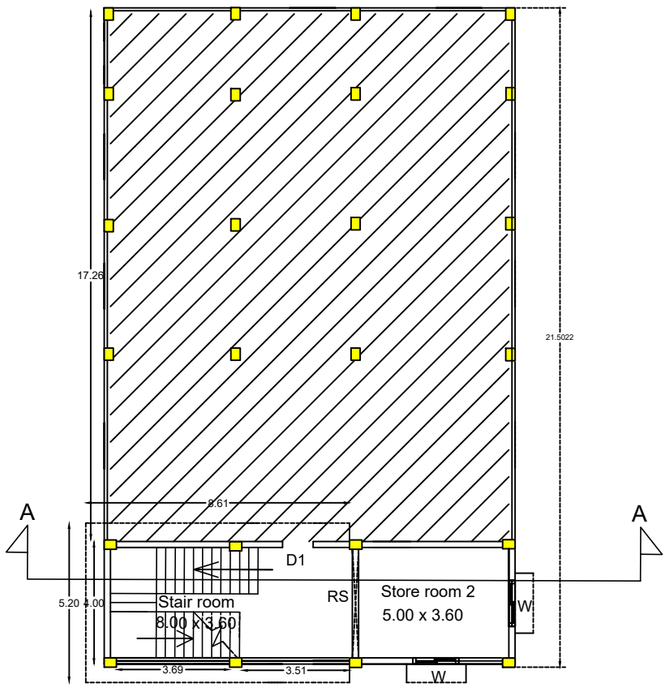
ELEVATION



SECTION A-A



GROUND FLOOR PLAN



FIRST FLOOR PLAN

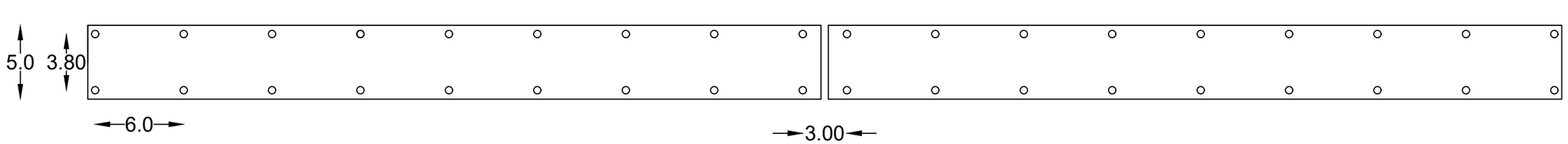
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DOOR	D1	= 1.00X2.10
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VENTILATOR	V	= 0.60X0.60

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

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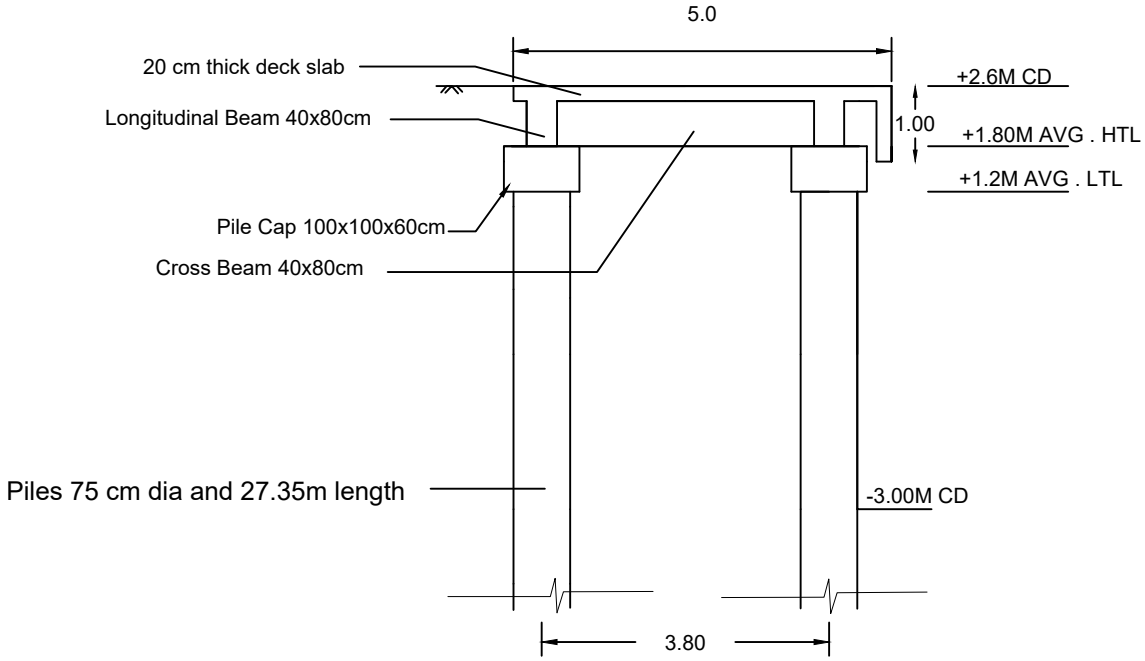


BERTHING WHARF- PLAN

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	13(a)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
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TITLE:	WHARF FOR BERTHING FACILITY				

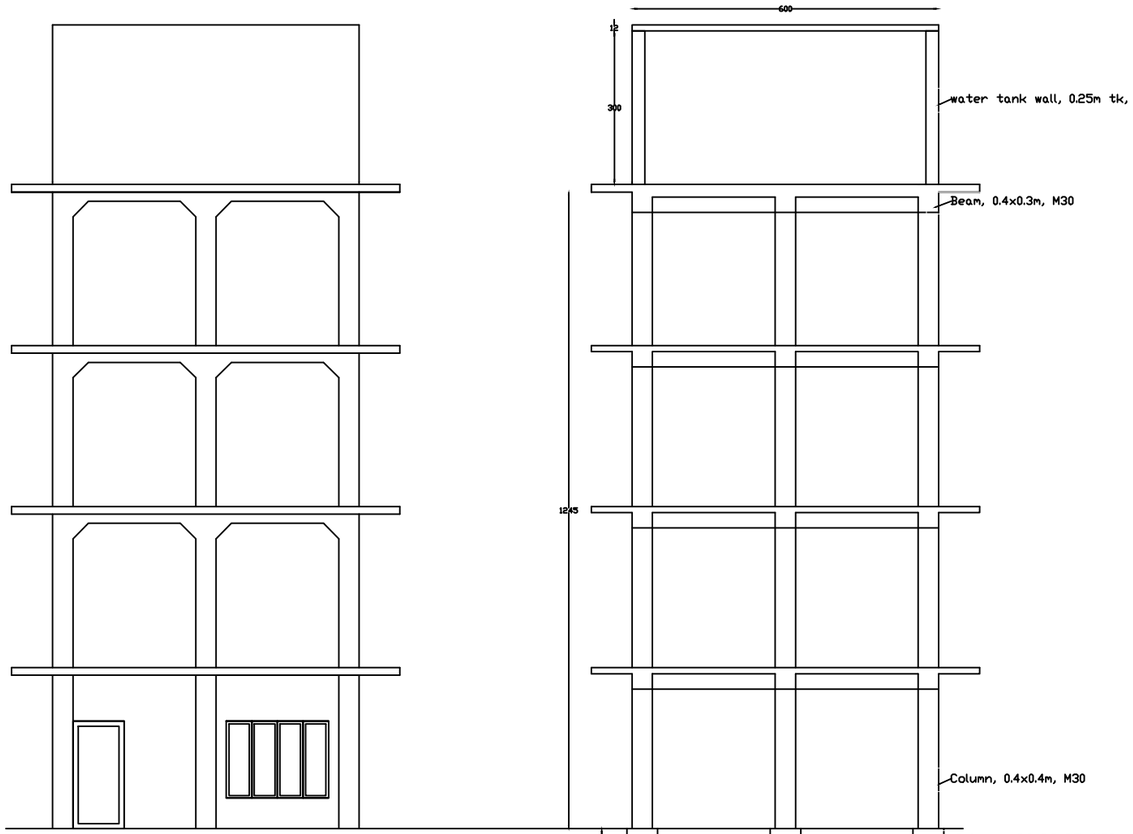


SECTION OF BERTHING WHARF

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

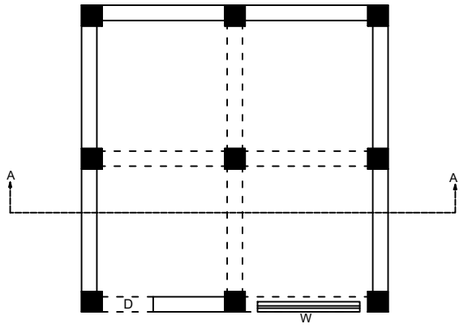
NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	13(b)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
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TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	WHARF FOR BERTHING FACILITY				



ELEVATION

SECTION AA



PLAN

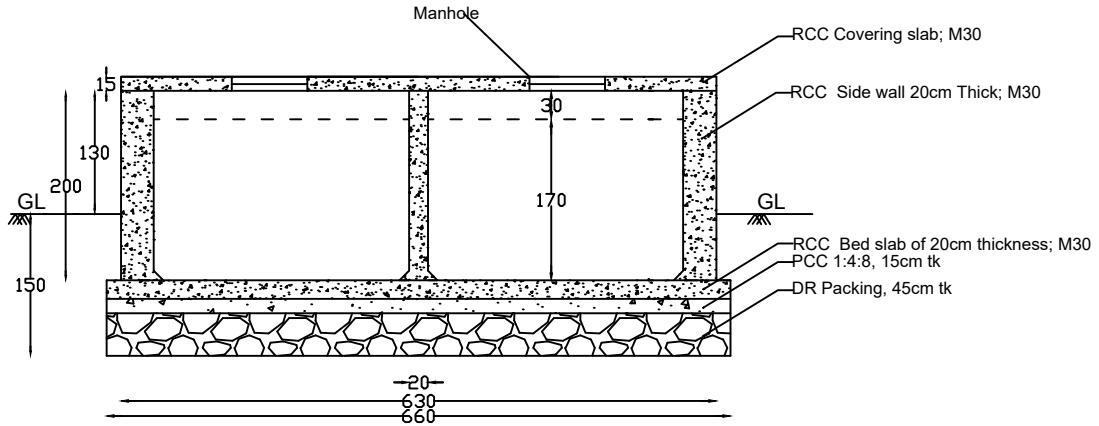
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WINDOW	200X150mm
AREA:-	36.00sqm

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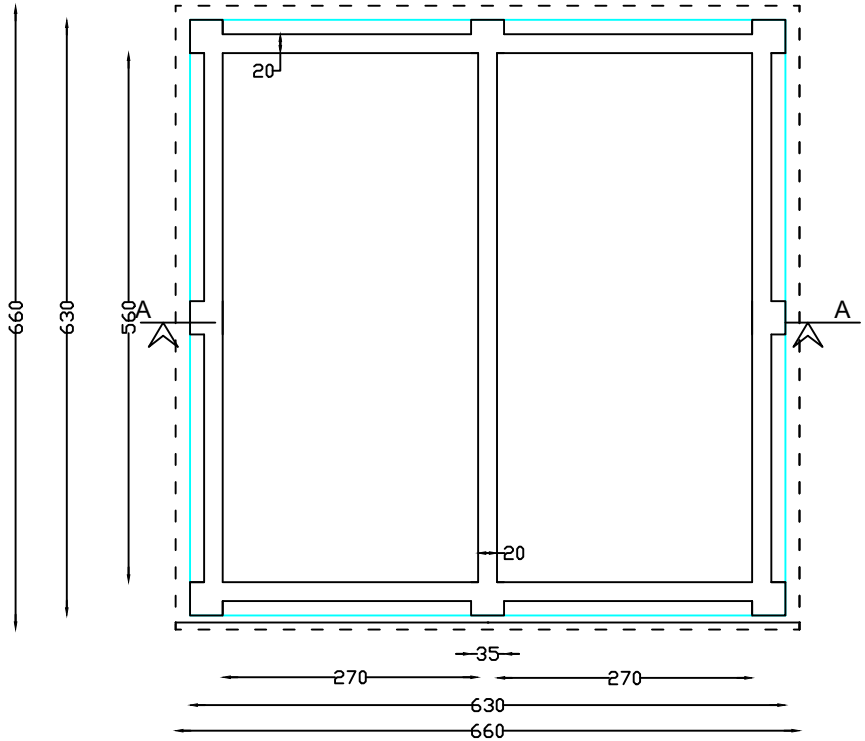
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

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TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	OH TANK				



SECTION A–A



PLAN SUMP

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	14 (b)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:80		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	WATER SUPPLY ARRANGEMENTS- SUMP				

Risk Assessment and Disaster Management Plan

for

Proposed Construction of Ajanur Fishing Harbour

at

Ajanur Village, Kasaragod Taluk, Kasaragod District, Kerala State
Fish Landing Capacity: 28,695 Tonnes Per Annum
[Schedule as per EIA Notification: Not applicable
Category: Standalone CRZ Clearance]

by

Harbour Engineering Department
Government of Kerala
Harbour Engineering Kasaragod Division,
Office of the Executive Engineer,
Clock Tower Junction, Near Railway Station, Kasaragod, Kerala – 671121

Prepared by

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Unit No. 206, 224, 225 Jai Commercial Complex,
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Email: kochi@ultratech.in, Tel: 022 – 25342776/25360198, 0484 4301947
NABET Certificate No.: NABET/EIA/24-27/RA0378; Valid till 18.10.2027

Document No: UTC/PRJ/DMP/00216/2024/01/01

Field Study Period: November 2024

September 2025

Revision History						
S. No.	**Document Reference No.**	**Issue No.**	**Revision No.**	**Revision Date**	**Brief Description of the Revision**	**Reason for Revision/ Amendment**
1.	UTC/PRJ/DMP/00216/2024	01	00	29.11.2024	-	Draft
2.		01	01	19.09.2025	-	Internal Review

Disclaimer:

This RA&DMP report has been prepared with all reasonable skills, knowledge, care and diligence by NABET accredited EIA Consultant, ULTRA TECH, in accordance with the terms of the contract (Agreement No. 13/2022-23/EE/HED/KGD dated 12/07/2022) with Harbour Engineering Department, Government of Kerala, the project proponent, incorporating General Terms and Conditions of Contract and taking in to account of the resources devoted to it, for the submission to Kerala Coastal Zone Management Authority, for consideration for CRZ clearance. The report was discussed with project proponent, in detail before releasing.

This RA&DMP report has been prepared using information received from project proponent, collecting primary data and compilation of secondary data from available resources. ULTRA TECH is not responsible for the origin and authenticity of the information provided by proponent. Neither this report nor any of its contents can be used for any purpose other than stated above, without the prior written consent from the project proponent.

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Abbreviations

Abbreviation	:	Description
BMTPC	:	Building Materials and Technology Promotion Council
CRZ	:	Coastal Regulation Zone
DDMA	:	District Disaster Management Authority
DDMP	:	District Disaster Management Plan
KSDMA	:	Kerala State Disaster Management Authority
NABET	:	National Accreditation Board for Education and Training
PPE	:	Personal Protective Equipment
PWD	:	Public Works Department
RA&DMP	:	Risk Assessment & Disaster Management Plan
SDMP	:	State Disaster Management Plan

Chapter 1. Introduction

1.1 Purpose of the Report

The Harbour Engineering Department (HED) proposes the construction of Ajanur Fishing Harbour at Ajanur Village, Kasaragod Taluk, Kasaragod District, Kerala. The fishing harbour is designed to have a fish landing capacity of 28,695 Tonnes Per Annum (TPA). The project attracts the Coastal Regulation Zone (CRZ) Notification 2019, as it falls in CRZ IA, CRZ IB, CRZ II, CRZ IVA and CRZ IVB and hence Risk Assessment and Disaster Management Plan (RA&DMP) is to be prepared to identify the risks from any potential hazards that may affect the safety of the users and the property and to outline the mitigation measures and management plan to prepare for, respond to and recover from the potential hazards. ULTRA TECH has been entrusted by HED to prepare the RA&DMP for submission to the Kerala Coastal Zone Management Authority (KCZMA) to obtain CRZ clearance.

1.2 Identification of the Project and the Project Proponent

The project is proposed by HED to address the issues faced by the local fishing community and the fishery industry in the region, which operates near the Chithari River. Fishers at Ajanur currently face challenges in their day-to-day fishing activities due to the migratory nature and periodic closing of the Chithari River mouth, and inadequate fish handling facilities at the existing Fish Landing Centre (FLC). Existing FLC includes only a dilapidated auction hall, net mending shed and toilet block. The master plan for the project involves the following features:

- North and south breakwaters for establishing the harbour basin and river training wall.
- Landside facilities of the harbour which include wharf, auction hall, berthing wharf, canteen, net mending shed, shop rooms, locker rooms, gate and gate house, office cum surveillance room, Rain Water Harvesting, Effluent Treatment Plant (ETP), etc.
- For the stabilization of the river mouth, a river training wall on the north side of the river mouth, dredging and reclamation is proposed in accordance with the modelling studies conducted by Central Water & Power Research Station (CWPRS), Pune.

The details of the project are given in Table 1.1.

Table 1.1: Details of the Project

Particulars	Descriptions
Name of the Project	Proposed construction of Ajanur Fishing Harbour at Ajanur Village, Kasaragod Taluk, Kasaragod District, Kerala.
Name and Address of the Correspondent	Office of the Executive Engineer, Harbour Engineering Kasaragod Division, Clock Tower Junction, Near Railway Station, Kasaragod, Kerala – 671 121 E-mail ID: eekgd.hed@kerala.gov.in
Village & Panchayath	Ajanur
Taluk & District	Kasaragod
State	Kerala
Proposed features	• Northern breakwater of length 1,150 m

<table>
<tr><th>Particulars</th><th>Descriptions</th></tr>
<tr><td></td><td>

Southern breakwater of length 425 m
River training work of Chithari river in the form of a breakwater of length 435 m
Reclamation bund of length 400 m
Wharf of dimension 120 m × 6.6 m
Auction hall of dimension 60 m × 15 m
Dredging proposed in between the north breakwater and river training work at the mouth of Chithari river
2-story building including canteen, rest shed, locker room, gear shed
Other buildings such as toilet block, workshop building, office room cum harbour surveillance camera room.
ETP, RWH facility landscaping and green belt
Mechanical conveyor system & Automation
Electrification and Installation of Solar energy system
Gate and Gate House with ATM and toll booth.
Water supply arrangements in the harbour with overhead tank and sump
Construction of wharf for berthing facility
Navigational aid, pressure washer and cleaning equipment,
Development of green area, approach road, internal road, parking area, drainage facility, compound wall and side protection work
Development of smart infrastructure and automated systems

</td></tr>
<tr><td>CRZ Zone*</td><td>
<table>
<tr><th>CRZ Zone</th><th>Length (m)</th><th>Area (m^2)</th></tr>
<tr><td>CRZ IA</td><td>16.48</td><td>-</td></tr>
<tr><td>CRZ IB</td><td>187.68</td><td>11,181.91</td></tr>
<tr><td>CRZ II</td><td>719.08</td><td>3,636.97</td></tr>
<tr><td>CRZ IVA</td><td>749.14</td><td>44,911.33</td></tr>
<tr><td>CRZ IVB</td><td>-</td><td>94.60</td></tr>
<tr><td>Total</td><td>1,672.38</td><td>59,824.81</td></tr>
</table>
</td></tr>
<tr><td>Fish landing capacity</td><td>28,695 TPA</td></tr>
<tr><td>Project cost</td><td>INR 20,000 Lakhs</td></tr>
<tr><td>Construction period</td><td>46 months</td></tr>
</table>

Source: DPR

**As per the CRZ report and map prepared by NCESS, Thiruvananthapuram*

The project site falls within CRZ IA, CRZ IB, CRZ II, CRZ IVA and CRZ IVB, based on the CRZ map prepared by National Centre for Earth Science Studies (NCESS), Thiruvananthapuram in May 2025 and therefore requires CRZ clearance from KCZMA in accordance with CRZ Notification 2019.

1.3 Project Location

Geo-coordinates of the project location are; northern breakwater - 12°20'11.66"N, 75°3'53.04"E, southern breakwater - 12°19'55.64"N, 75°3'58.95"E, river training works: 12°20'17.39"N, 75°3'51.34"E and harbor

facilities: 12°20'10.18"N, 75°3'54.87"E, at Ajanur Village, Kasaragod Taluk, Kasaragod District, Kerala State.

The index map showing the project site is given in Figure 1.1.

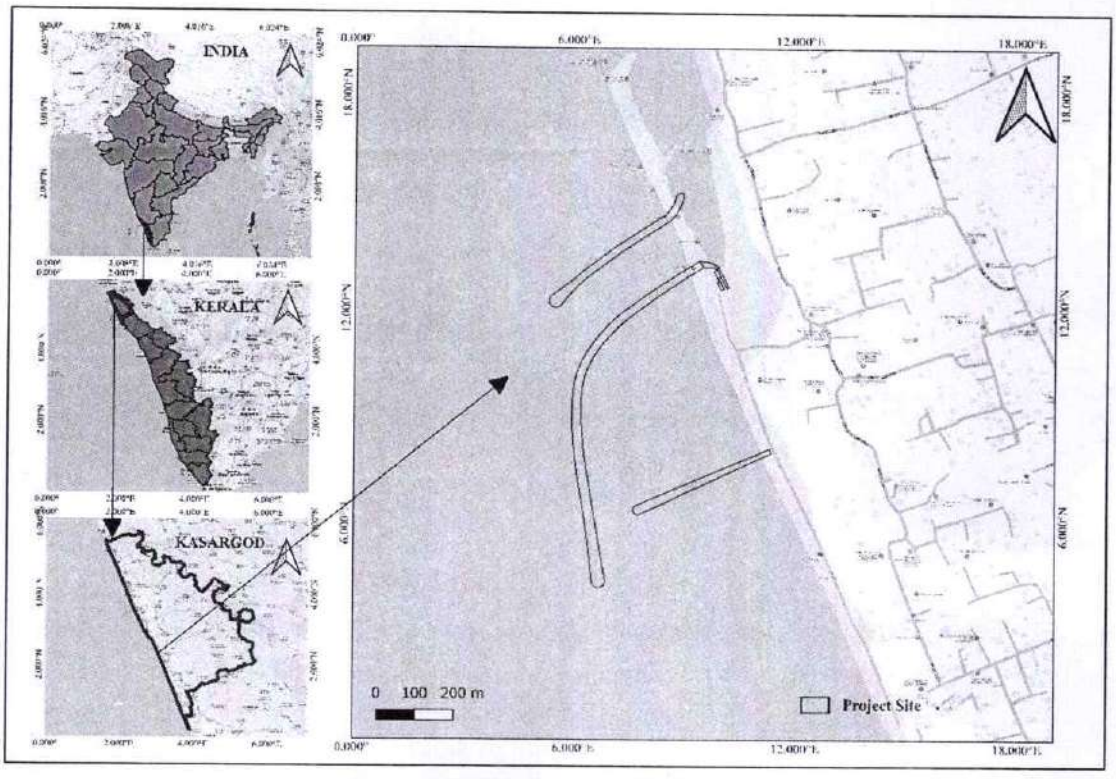


Figure 1.1: Index map of Project Site

Google earth imagery of the proposed project site is given in Figure 1.2.



Figure 1.2: Google Earth Imagery of Proposed Project Site

Geo-tagged photographs of the project site are shown in Figure 1.3.

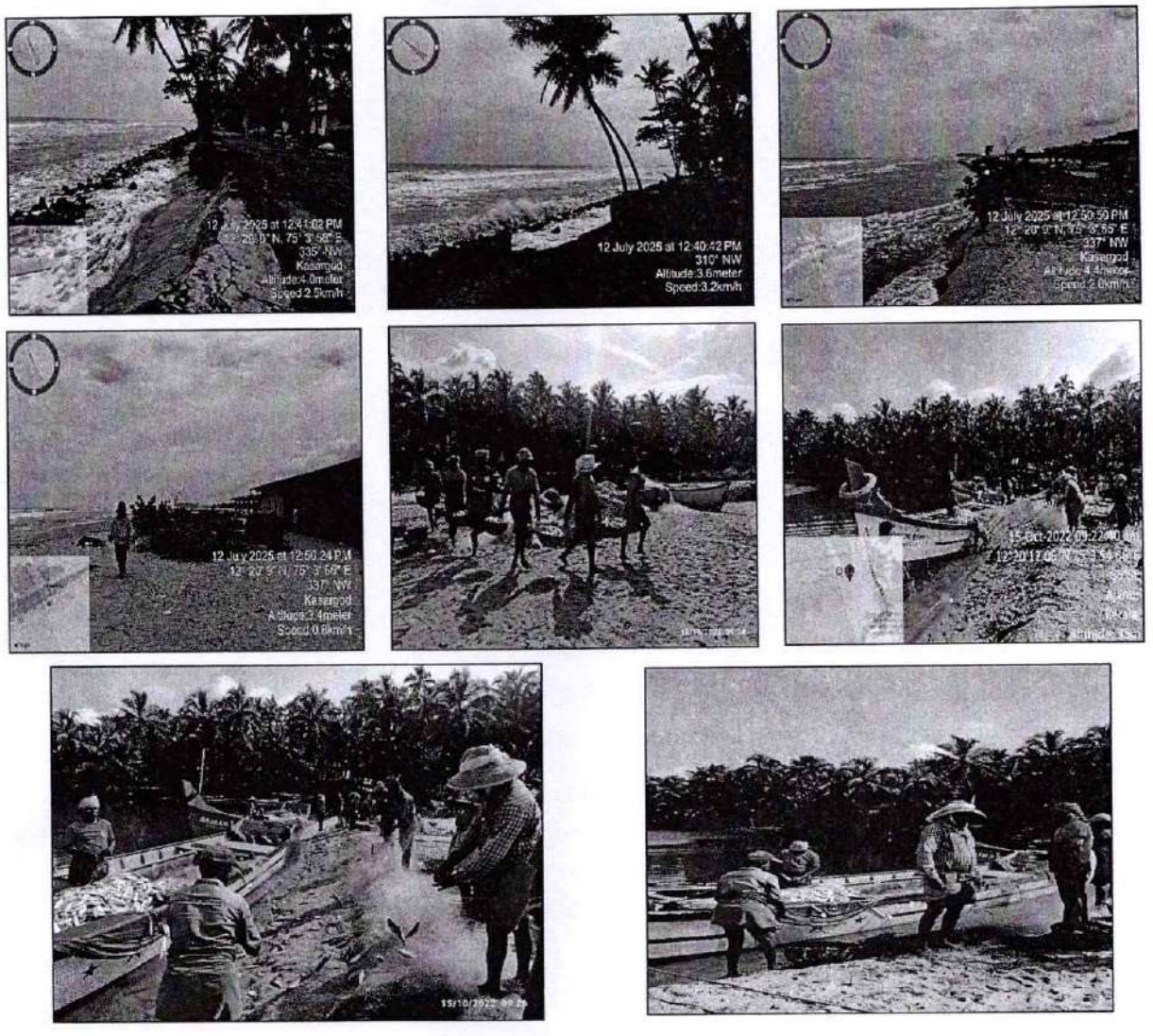


Figure 1.3: Geo-tagged Photographs of the Project Site

1.4 Project Site Description

The connectivity map to the proposed site is shown in Figure 1.4.

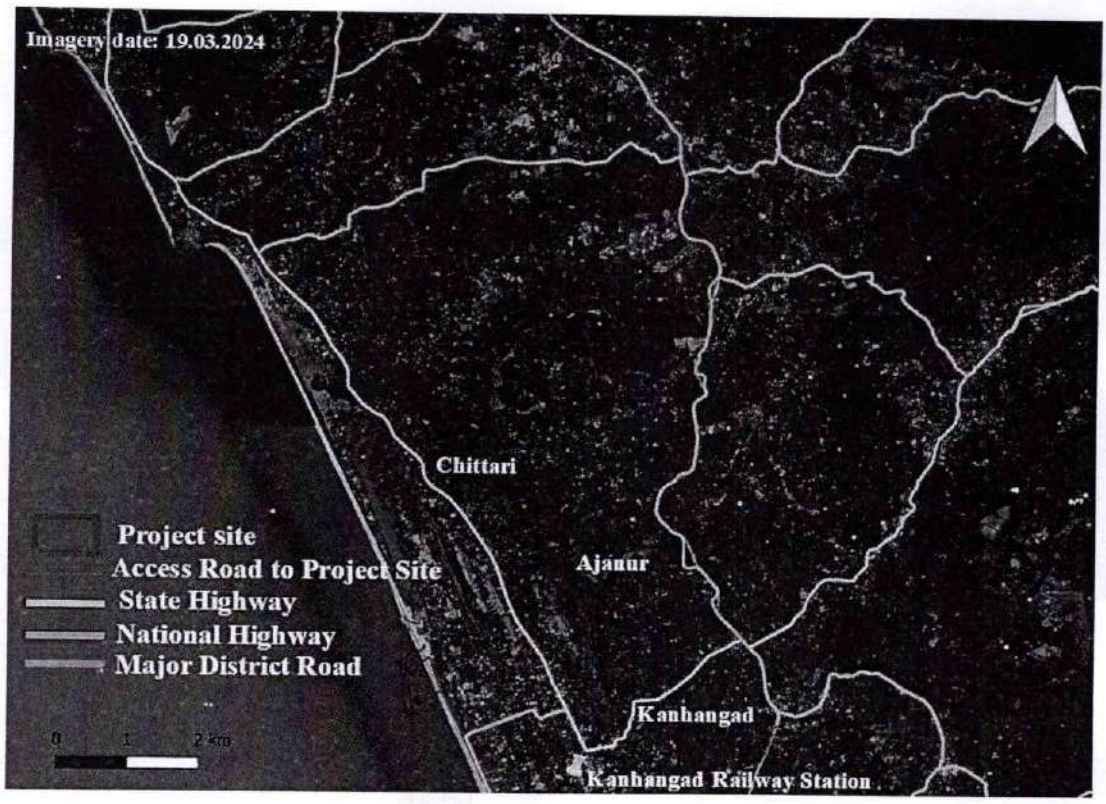


Figure 1.4: Connectivity Map of the Project Site

The proposed project site is at a distance of 2.4 km from State Highway (SH) 57 (Kasaragod – Kanhangad Highway). The access road to project site has a width of around 5 m. Existing FLC can be directly accessed from this public road. The Crescent Road and Palayi - Kanhangad Road links the access road with SH 57. It is proposed to renovate the internal roads and approach road to the proposed fishing harbour facilities.

1.5 Scope of RA&DMP Report

- The extent of the risk assessment is limited to the project site in Ajanur Village during its construction period (46 months) and operation phase.
- The field studies (reconnaissance and ground truth verification) were conducted during November 2024
- Hazard identification is done based on Kerala State Disaster Management Plan (KSDMP), 2016 and District Disaster Management Plan (DDMP), 2015 of Kasaragod district.

1.6 Objectives of the RA&DMP Report

The overall objective is to identify the significant risks from any potential hazards that may affect the safety of the users and the property and to outline the strategies, responsibilities, and actions necessary to prepare for, respond to, and recover from the potential hazards and to improve the overall resilience of the project to any potential hazards.

- Identify and assess potential hazards during the construction and operation phases of the proposed project of construction of Ajanur Fishing Harbour at Ajanur Village, Kasaragod Taluk, Kasaragod District, Kerala.

- Analysis of the significance of risks from the identified hazards.
- Develop and implement mitigation strategies for the significant risks to reduce the impact of disasters on life, property and the environment.
- Establish emergency management plan for emergency preparedness and emergency response; review and update it to ensure continuous improvement.
- Facilitate post-disaster recovery.

Chapter 2. Hazard Identification and Risk Analysis

2.1. Hazards identified by Kerala State Disaster Management Authority

The Kerala State Disaster Management Authority (KSDMA) has identified about 40 hazards likely to occur in the State, which include natural and anthropogenic hazards. The hazards reported in the State Disaster Management Plan (SDMP), 2016 of Kerala is given in Table 2.1.

Table 2.1: Hazards Identified by KSDMA

S. No.	Hazards in SDMP 2016	
	Category	Type
1.	Natural Hazards	Flood (Riverine, Urban and Flash Floods)
2.		Landslides (includes debris flows, rock fall, rock avalanche, rockslide, landslips and mud slips
3.		Drought
4.		Coastal hazards (High waves, Storm surges, Kallakadal, Tsunami, Salt Water Intrusion, Coastal erosion)
5.		Wind (Cyclone, Gustnados, Gusty winds)
6.		Lightning
7.		Earthquake
8.		Human epidemics
9.		Plant disease epidemics and pest attack on crops
10.		Avian epidemics
11.		Animal epidemics
12.		Pest attack of human habitations
13.		Forest Fire
14.		Meteorite/asteroid impacts
15.		Soil Piping
16.		Heat wave/sunburn/sunstroke
17.		Natural background radiation
18.	Anthropogenic Hazards	Stampedes
19.		Fire crackers accidents
20.		Petro-chemical transportation accidents
21.		Industrial accidents
22.		Dam break
23.		Dam spillway operation related floods & accidents
24.		Oil spill
25.		Road accidents involving civilian transport vehicles
26.		Human induced forest fire
27.		Human-animal conflicts
28.		Fire accidents in buildings and market places
29.		Boat capsizing
30.		Accidental drowning

S. No.	Hazards in SDMP 2016	
	Category	Type
31.		Building collapse
32.		Hooch accident
33.		Air accidents
34.		Rail accidents
35.		Terrorism, riots and Naxalite attacks
36.		Nuclear and radiological accidents
37.		Space debris impacts
38.		Biological accidents
39.		Occupational and recreational area related hazards
40.		Accidents in Armed Forces premises

Source: SDMP Kerala, 2016

2.2. Hazards identified by District Disaster Management Authority

The District Disaster Management Authority (DDMA) of Kasaragod identified various hazards specific to Kasaragod district, as reported in the DDMP Kasaragod, 2015. The hazards identified by the DDMA are depicted in Table 2.2.

Table 2.2: Hazards Identified by DDMA, Kasaragod District

S. No.	Classification	Type of Disaster
1.	Naturally Triggered/ Weather Related	Flood
		Coastal Hazards (Tsunami, Coastal erosion, Kallakadal, Storm surge)
		Thunder and lightning
		Cyclone
		Drought
2.	Geological	Landslides
3.	Biological	Epidemics
		Cattle epidemics
		Food poisoning
		Pest attack
4.	Anthropogenically/Technologically Triggered	Fireworks accidents
		Road accidents
		Human triggered forest fire
		Stampede
		Short circuit and related fire
		Building collapse
		Boat capsizing
		Tourism related drowning
		Rail accidents
		Hooch accident

Source: DDMP Kasaragod, 2015

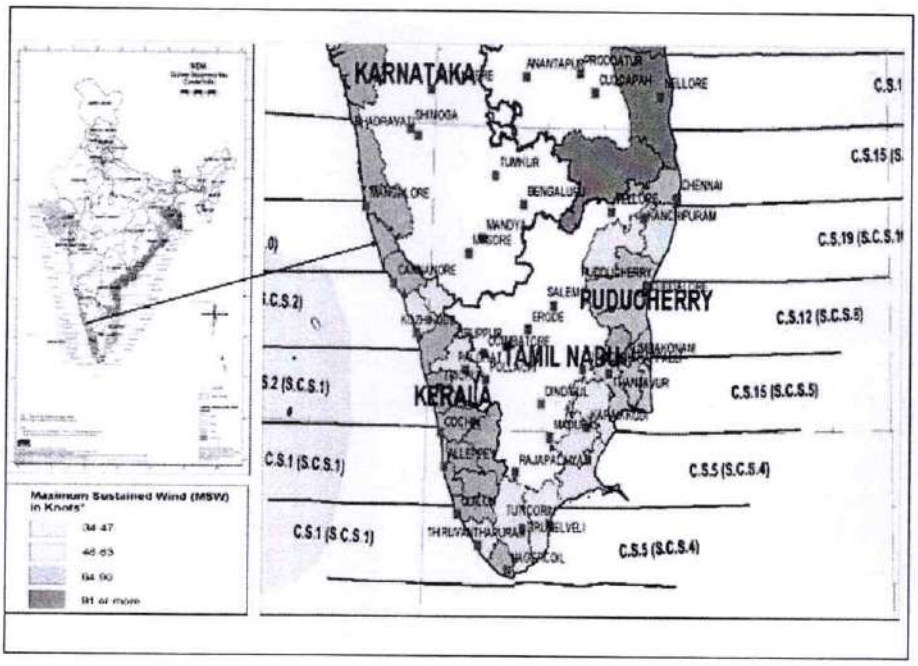
2.3. Identification of the project site specific hazards

2.3.1 Natural Hazards

During the construction phase of the project, natural disasters can cause damage to construction materials, machinery and equipment as well as accidents/ loss of life of construction workers. During the operation phase, an occurrence of natural disaster can lead to loss of life and property at the project and also of nearby residents.

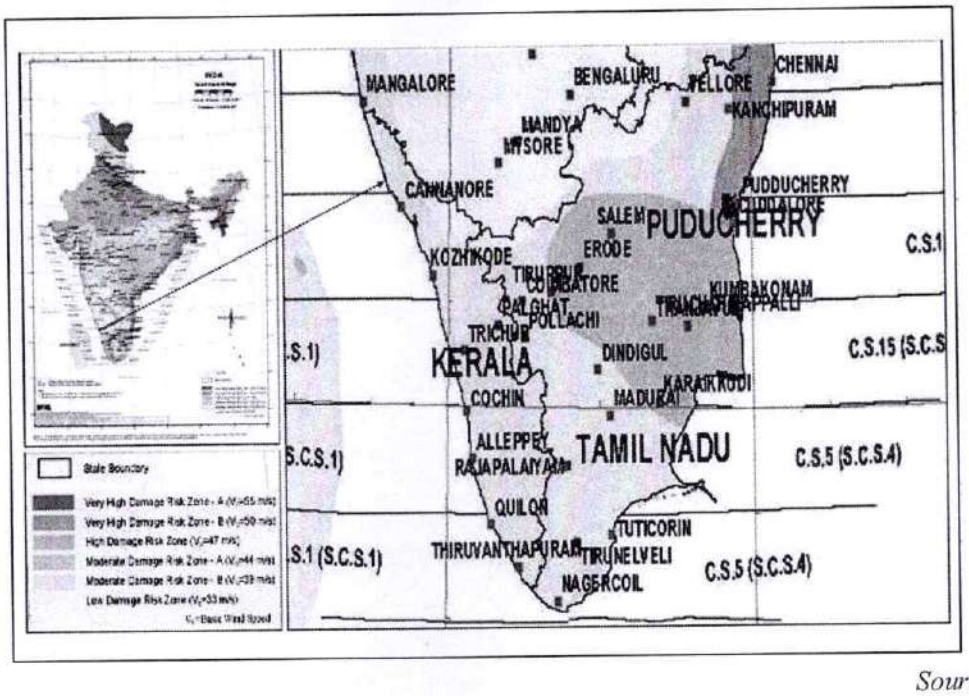
a) Cyclone

The number of cyclones formed over the Arabian sea/ Lakshadweep Sea has increased dramatically, causing concerns in the state of Kerala. The proximity of the project to the Arabian sea/ Lakshadweep sea increases the hazard susceptibility from cyclones. As per the Cyclone Hazard Map prepared by the Building Materials and Technology Promotion Council (BMTPC) in 2010 (Figure 2.1), the Maximum Sustained Wind (MSW) at the project site is 34-47 Knots. As per the Wind Hazard Map published by BMTPC (Figure 2.2) the project site falls within the moderate damage risk zone - B with basic wind speed (Vb) of 39 m/s. Cyclones can cause threat to the life of the on-site workers during construction phase and operation phase of proposed project. There could be chances of short circuiting, damage to the structures, etc. due to cyclones.



Source: BMTPC

Figure 2.1: Cyclone Hazard Map of the Project Site

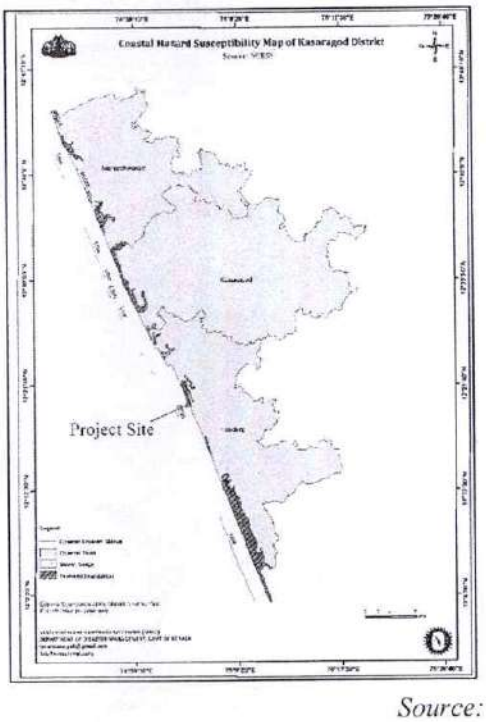


Source: BMTPC

Figure 2.2: Wind Hazard Map for the Project Site

b) Coastal Hazards

As per the coastal hazard susceptibility map of Kasaragod district prepared by NCESS for DDMP 2015, the project site falls in storm surge and tsunami inundation region. The Coastal Hazard Susceptible Map of Kasaragod district is given in Figure 2.3.

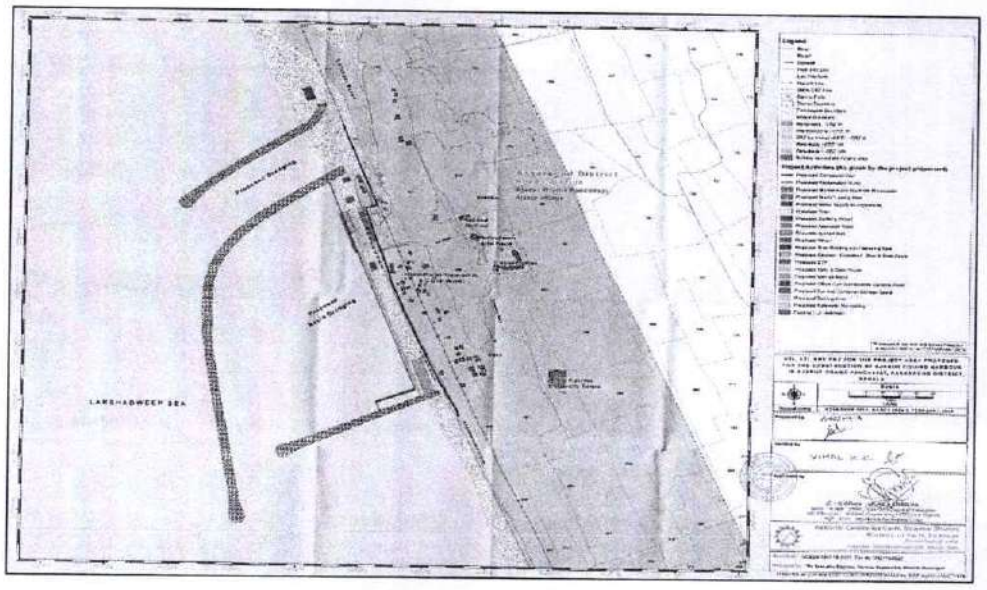


Source: DDMP 2015, Kasaragod

Figure 2.3: Coastal Hazard Susceptibility Map of Kasaragod District

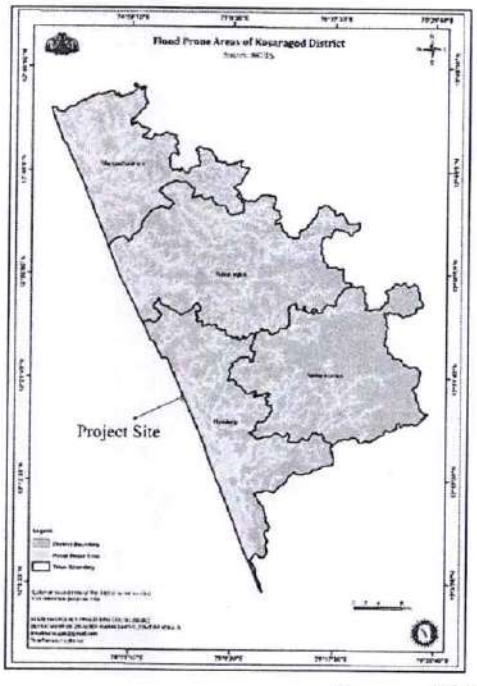
c) Flood

The 'hazard line', which indicates the maximum landward limit of flooding and water level rise, passes near the proposed project site. The CRZ map showing the proximity of the hazard line to the project site is given in Figure 2.4. The hazard line is not a regulatory boundary but an essential tool for disaster preparedness. As per the flood prone area map of Kasaragod district prepared by NCESS for DDMP, Kasaragod – 2015 given in Figure 2.5, project site is falls under flood prone area.



Source: CRZ Status Report prepared by NCESS

Figure 2.4: CRZ Map of the Project Site

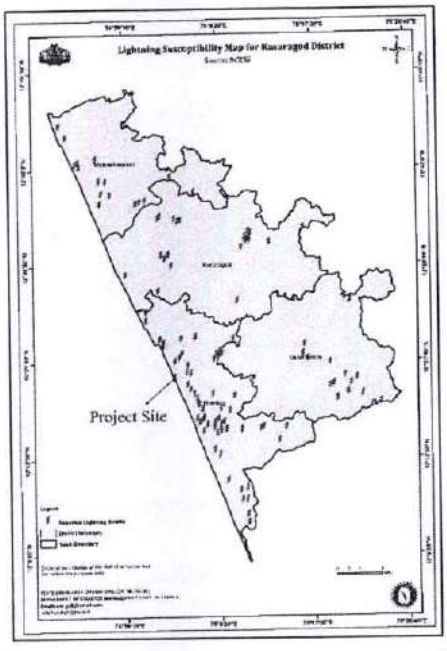


Source: DDMP Kasaragod, 2015

Figure 2.5: Flood Prone Area Map of Kasaragod District

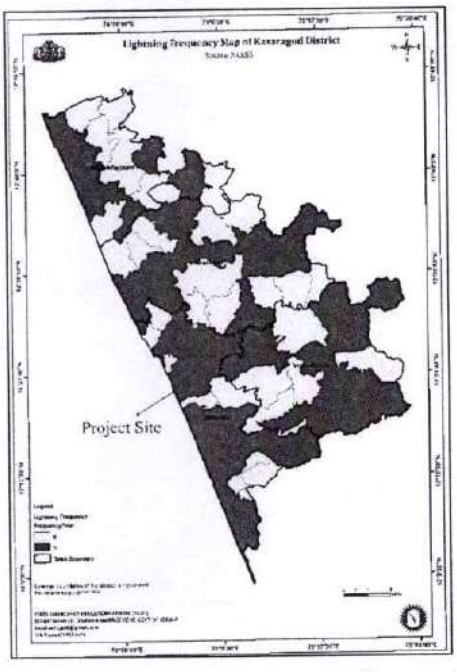
d) Lightning

As per DDMP – 2015 of Kasaragod district, the project site is near to lightning susceptible area and lightning frequency per year for the project site is 1. However, no history of lightning was reported by the locals during the socioeconomic survey. Lightning susceptibility map of Kasaragod district is shown in Figure 2.6 and lightning frequency map of Kasaragod district is shown in Figure 2.7.



Source: DDMP Kasaragod, 2015

Figure 2.6: Lightning Susceptibility Map of Kasaragod District



Source: DDMP Kasaragod, 2015

Figure 2.7: Lightning Frequency Map of Kasaragod District

e) Landslide

As per the landslide susceptibility map of Kasaragod district given in Figure 2.8, the project site is not falling in landslide susceptible area. Nearest hazard zone is low hazard zone, which located 6.5 km, E from northern breakwater.

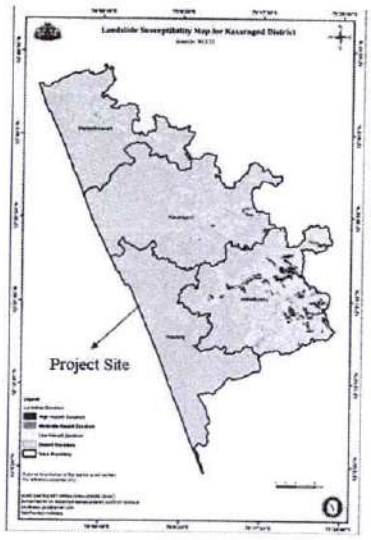
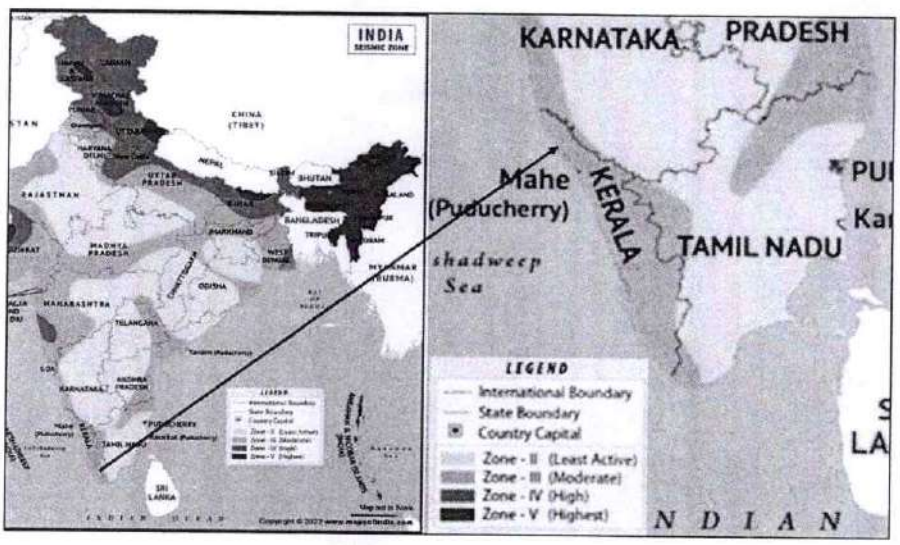


Figure 2.8: Landslide Susceptibility Map
Source: DDMP 2015, Kasaragod

f) Earthquake

As per the Seismic Zone classification by IS 1893 (Part-I): 2002 prepared by Geological Survey of India (GSI) the proposed project site is falls under Seismic Zone III (Moderate Risk Zone). The Seismic Zone Map of the project site is given in Figure 2.9

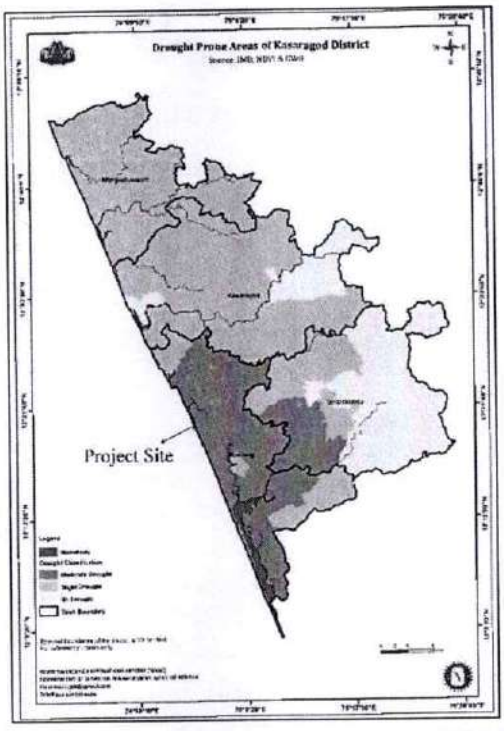


Source: Geological Survey of India

Figure 2.9: Seismic Zone Map of the Project Site

g) Drought

As per the Drought Prone Area Map of Kasaragod district in DDMP 2015, the proposed project site is located in moderate drought area. Drought Prone Area Map of Kasaragod district is given in Figure 2.10.



Source: DDMP Kasaragod, 2015

Figure 2.10: Drought Prone Area Map of Kasaragod District

h) Epidemics

As the proposed project is a construction of harbour with a workforce sourced from various locations, epidemics can spread rapidly during outbreak periods, especially if workers and suppliers come from different regions. Not following necessary regulations imposed by the concerned regulatory authorities during an epidemic can lead to a significant risk of disease spread among the workforce and nearby communities.

2.3.2 Anthropogenic Hazards

The occurrence of disaster as the result of anthropogenic activities is due to the human intervention.

a) <u>Hazards during Construction Phase</u>

Hazards identified during the construction phase are given below:

- Oil & chemical spills
- Vessel Collisions
- Boat capsizing
- Accidental drowning
- Accidents at the construction site on the land like falling from heights, tripping, etc.

b) Hazards during the Operation Phase

Hazards identified during the operation phase are given below:

- Design deficiencies
- Damage to the structures
- Inadequate disposal of waste
- Overcrowding within the auction hall and its surroundings

2.4. Summary of the project site specific hazards

The possible hazards identified for proposed project are given in Table 2.3.

Table 2.3: Types of Hazards Identified for the Project

Natural Calamities		Anthropogenic Hazards
Weather related: • Coastal Hazard • Flood • Cyclone • Earthquake • Lightning • Drought	**Biological:** • Epidemics	• Accidents during construction phase • Accidents during operation phase

2.5. Risk assessment for the project site specific hazards

2.5.1 Consequences Assessment

The risk consequence levels are defined, for the purpose of the quantification of the risk assessed. These are given in Table 2.4. The consequence levels are defined based on the severity of impact due to the hazard, on people, environment and property.

Table 2.4: Risk Consequence Levels

Risk Levels	Consequence	Qualitative Description of Impact on		
		People	Environment	Property
1	Insignificant (Manageable)	Event does not result in injury (no medical treatment required)	No damage	No damage
2	Minor (Short term, manageable)	Reversible injury or illness	Minor impact of short duration or short-term damage	Minor damage
3	Moderate (Medium term)	Irreversible disability or impairment to one or more persons	Short term damage resulting in complaints, localized impact	Moderate damage
4	Major (Long term)	Severe injuries to one or more persons, single fatality	Significant impact locally and potential for off-site impacts	Major damage

Risk Levels	Consequence	Qualitative Description of Impact on		
		People	Environment	Property
5	Catastrophic (Irreversible, permanent)	Multiple fatalities or irreversible injuries	Significant impacts to regional ecosystems and threatened species potential for widespread off-site impacts	Significant loss

2.5.2 *Standard Risk Assessment Matrix*

The risk assessment matrix for the proposed project is developed on the basis of the likelihood of the risk and consequences levels. The Risk Assessment Matrix is given in Table 2.5.

Table 2.5: Standard Risk Assessment Matrix

Risk Probability/ Likelihood	Consequences				
	Catastrophic (Irreversible, permanent) (5)	Major (Long term) (4)	Moderate (Medium term) (3)	Minor (Short term, manageable) (2)	Insignificant (Manageable) (1)
Almost certain (5)	Extreme (25)	Extreme (20)	High (15)	Medium (10)	Medium (5)
Likely (4)	Extreme (20)	High (16)	High (12)	Medium (8)	Low (4)
Possible (3)	High (15)	High (12)	Medium (9)	Medium (6)	Low (3)
Unlikely (2)	Medium (10)	Medium (8)	Medium (6)	Low (4)	Low (2)
Rare (1)	Medium (5)	Low (4)	Low (3)	Low (2)	Low (1)

2.5.3 *Project Specific Consequence Analysis and Risk Assessment*

Site and project specific risk assessment matrix, before the adoption of any sort of mitigation measures are depicted in Table 2.6.

Table 2.6: Project Specific Risk Assessment Matrix (without Mitigation Measures)

S. No.	Hazards	Likelihood	Consequences	Level of Risk (without mitigation)
Naturally Triggered / Weather Related Hazards				
1.	Cyclone	Possible (3)	Major (4)	High (12)
2.	Lightning	Possible (3)	Moderate (3)	Medium (9)
3.	Earthquake	Unlikely (2)	Moderate (3)	Medium (6)
4.	Drought	Possible (3)	Moderate (3)	Medium (9)
5.	Flood	Possible (3)	Moderate (3)	Medium (9)
6.	Coastal Hazard	Possible (3)	Major (4)	High (12)

S. No.	Hazards	Likelihood	Consequences	Level of Risk (without mitigation)
7.	Epidemics	Unlikely (2)	Moderate (3)	Medium (6)
Anthropogenic / Technologically Triggered				
1.	Accidents during construction phase	Likely (4)	Major (4)	High (16)
2.	Accidents during operation phase	Possible (3)	Moderate (3)	Medium (9)

It is noted that among the natural hazards, cyclone, and coastal hazard present a high level of risk, while lightning, earthquake, drought, flood and epidemics pose a medium level of risk. Regarding anthropogenic hazards, the risks anticipated from accidents occurring during the construction phase is assessed as high and for the operational phase is assessed as medium. This analysis restates the significance of adopting site and project specific mitigation measures for reducing the risks.

Chapter 3. Mitigation Measures for the Identified Risks

The likelihood and consequences of the project specific risks can be managed by suitable planning and execution in the construction and operation phases of the project. The important aspects of preparedness for risk management and mitigation measures that shall be followed to reduce the consequence of risks are:

- Design measures shall be given prime importance in reducing the risks. The design of proposed structures shall be as per the standards and Indian Standard (IS) code.
- Close co-ordination with the DDMA, Kasaragod district shall be done, to obtain early warnings of any natural disasters.
- Adequate safety measures, sign boards and warning signals shall be installed and regularly monitored.
- Sufficient number of staffs trained in first aid measures shall be deployed at the site at all times.
- Establish regular maintenance schedules for emergency devices and systems, such as lighting and structural monitoring equipment, to ensure they remain fully operational at all times.

The preparedness for specific risks related to the project is detailed in the following sections.

3.1 Proposed Mitigation Measures for Identified Risks

The mitigation measures that shall be scrupulously followed specifically against the identified risks are given below:

3.1.1 Cyclone

- Technical assistance for early warning and hazard risk mitigation shall be obtained from DDMA Kasaragod.
- Emergency response team shall be activated immediately upon receiving timely warning from DDMA and adequate measures shall be taken when a warning for cyclone is issued to evacuate the workers.
- Construct harbor buildings, warehouses, and shelters using cyclone-resistant materials and design standards.
- During cyclone warnings, all loose cargo, containers, and equipment should be secured or moved to safer storage areas to prevent them from becoming projectiles in high winds.

3.1.2 Coastal Hazards

- Implement and maintain an early warning system for fishermen and harbour authorities to receive real-time alerts about tsunamis or high wave activities.
- Set up clear evacuation protocols and disseminate knowledge about safety measures during coastal emergencies.
- Restore natural sand dunes and plant mangroves or other salt-tolerant vegetation as natural buffers against storm surges and coastal erosion.

3.1.3 Flood

- Synchronize the operation schedule with meteorological warnings to avoid work during heavy rain.
- Set up flood warning systems to alert harbour authorities, ship operators, and personnel, enabling them to take precautionary measures.
- Ensure that the harbour receives real-time data on weather conditions.
- Enhance storm water drainage systems to handle excess rainwater and prevent flooding within the

harbour area. Ensure regular maintenance to keep drains and culverts clear of debris.

- Use flood-resistant materials for buildings and equipment near the waterfront.

3.1.4 Lightning

- Provide lightning arrestors in the building at the landside facilities of the harbour.
- Regularly monitor weather forecasts and issue warnings when thunderstorm forecasts.
- Use audible or visual alarms in outdoor and exposed areas of a harbour to warn personnel of approaching lightning storms.
- Implement protocols to suspend operations during thunderstorms.
- Establish designated lightning-safe shelters like fully enclosed buildings for workers.

3.1.5 Earthquake

- Emergency evacuation plan along with safety measures shall be implemented. All the information and instructions from concerned department and DDMA shall be scrupulously followed.
- Design and construct buildings and infrastructure to comply with national seismic building codes that account for earthquake forces.

3.1.6 Drought

- The project proposes to reduce its dependence on groundwater by harvesting and reuse of rainwater collected from the roof of buildings proposed in the harbour.
- Apart from this, measures shall be explored for the recharge of storm runoff into the groundwater.

3.1.7 Epidemics

- Regulations issued by the concerned regulatory authorities in the event of an epidemic shall be scrupulously followed at the site during the construction phase.
- To avoid the spread of epidemics among the workers, they shall be educated on the importance of timely consulting a doctor, taking necessary vaccinations, and following safety precautions like wearing masks, using sanitizers, etc.
- Adequate provisions shall be provided at the site to immediately isolate and give proper medical care to the workers with symptoms.
- Measures shall be implemented to restrict pests, animals, and birds from entering the site, by the installation of fencing, pest control, and regular monitoring of potential entry points, to prevent the displacement of waste.
- Stormwater management system during monsoon season must be ensured

3.1.8 Accidents during Construction Phase of the Project

- Ensure safe storage and handling of oil and hazardous chemicals.
- Ensure emergency response equipment like protective gear, absorbents, neutralizing agents, and containment booms are readily available.
- Implement continuous monitoring of water and soil quality in and around the harbour to detect any signs of contamination early and take immediate corrective action.
- Ensure that all machinery operators receive thorough training on equipment use, safety procedures, and emergency protocols. Regular refresher courses should also be provided.

- Schedule construction activities to avoid the peak erosion periods, such as during the rainy season or high-wave conditions, to minimize the risk of erosion.
- Install temporary barriers or sandbags to protect construction sites and adjacent coastal areas from erosion caused by storms or high waves.
- Ensure boats are loaded safely and within capacity.
- Implement physical barriers or restricted access to dangerous water areas where drowning risks are high, such as construction sites or deep bodies of water.
- Develop and communicate a detailed emergency response plan for drowning incidents, including procedures for rescuing individuals, administering first aid, and contacting emergency services.

3.1.9 Accidents during Operation Phase of the Project

- Hazardous materials shall be stored in designated locations after obtaining necessary approvals.
- The leachable materials shall be stored in closed containers/leak proof packaging.
- Sufficient number of staff trained in first aid measures shall be deployed at the site at all times.
- Adequate number of first aid kits shall be provided.
- Fishers shall be encouraged to use adequate PPE & adequate safety measures shall be installed and regularly monitored.
- Skilled workers shall be chosen for operating the machineries.
- Develop and enforce traffic management plans to ensure the safe movement of vehicles and vessels within the harbour.
- Install and maintain clear and visible safety signs and warnings around the harbour to alert personnel and visitors to potential hazards and safety procedures.
- Establish and enforce standard operating procedures (SOPs) for all harbour operations, including emergency response to ensure consistency and safety.
- Continuously monitor weather conditions and implement protocols to suspend operations or take precautionary measures during adverse weather conditions, such as storms or high winds.
- Maintain reliable communication systems for coordination among personnel, ships, and emergency services. Use radios, alarms, and signaling devices to ensure effective communication.
- Conduct regular risk assessments to identify potential hazards and vulnerabilities in harbour operations. Use the findings to update safety protocols and mitigation measures.
- Implement measures to prevent environmental contamination, such as proper waste disposal, spill response systems, and monitoring of water quality to detect any potential pollution early.

3.2 Updated Risk Assessment Matrix with Mitigation Measures

The implementation of mitigation measures reduces the likelihood and consequences of the hazards. Reduction of the likelihood of risk and level of consequences reduces the overall level of risk, as shown in Table 3.1.

Table 3.1: Project Specific Risk Assessment Matrix with Mitigation Measures

S. No.	Hazards	Level of Risk (without mitigation)	Likelihood	Consequences	Level of Risk (with mitigation)
Naturally Triggered / Weather Related Hazards					
1.	Cyclone	High (12)	Possible (3)	Moderate (3)	Medium (9)
2.	Lightning	Medium (9)	Possible (3)	Minor (2)	Medium (6)
3.	Earthquake	Medium (6)	Unlikely (2)	Minor (2)	Low (4)
4.	Drought	Medium (9)	Possible (3)	Insignificant (1)	Low (3)
5.	Flood	Medium (9)	Possible (3)	Minor (2)	Medium (6)
6.	Coastal Hazard	High (12)	Possible (3)	Moderate (3)	Medium (9)
7.	Epidemics	Medium (6)	Unlikely (2)	Minor (2)	Low (4)
Anthropogenic / Technologically Triggered					
1.	Accidents during construction phase	High (16)	Unlikely (2)	Minor (2)	Low (4)
2.	Accidents during operation phase	Medium (9)	Unlikely (2)	Minor (2)	Low (4)

The targeted mitigation measures implemented in the proposed construction have significantly minimized the potential impact of identified risks, as clearly evidenced in the updated Risk Assessment Matrix. By proactively addressing critical hazards, these measures have effectively minimized the probability of occurrence and mitigated the intensity of their impacts. As a result, the overall risk levels have been substantially reduced, enhancing the safety and stability of operations. This approach highlights the success of risk management strategies and establishes a strong basis for ongoing risk reduction efforts.

Chapter 4. Emergency Management Plan

The RA&DMP has identified the safe transition from normal operation to emergency operations and systematic discontinuation of the construction and operation activities, if required, and the delegation of authority from operations personnel to emergency response personnel. For this purpose, the plan has identified an emergency preparedness measures with appropriate lines of authority with succession planning and actuating the response management which ensures a proactive and structured response to potential emergencies that may arise in the proposed construction of Ajanur Fishing Harbour, due to natural or anthropogenic hazards.

4.1 Emergency Preparedness Measures

As emergency preparedness measures, the following services shall be made available at the site to ensure efficient implementation of the emergency management plan:

4.1.1 Emergency Response Team

For the safe transition from normal operation to emergency operations and systematic shutdown during the emergency, an Emergency Response Team with appropriate lines of authority with succession planning and actuating the response management at site has been identified. Objective of an Emergency Response Team are:

- To promptly control problems as they develop at the site.
- To prevent or limit the impact on other areas.
- To provide emergency personnel, selecting them for duties compatible with their normal work functions wherever feasible. The duties & functions assigned to various people include making full use of existing organizations and service groups such as fire, safety, health, medical, transportation, personnel, maintenance, and security.
- Employees must assume additional responsibilities as per laid down procedure of DMP whenever an emergency alarm sounds.
- In setting up the organization, the need for round-the-clock coverage is essential. Shift personnel must be prepared to take charge of the emergency control functions or emergency shutdown of system, if needed, until responsible personnel arrive at the site of emergency. The organization should have an alternate arrangement for each function.
- Internal safety audits shall be conducted at regular intervals to ensure that all necessary equipment and facilities for an emergency response is rightly maintained and is up-to-date. It shall be also ensured the workers are given refresher training for emergency preparedness and rescue.

The emergency organization is responsible to take over the site activities in case of a hazard and to act promptly to control the event and to restore back the site post the hazardous event. The responsibilities for decision making are clearly shown in the emergency organization chart. The plan has identified each responder's position, mission, duties and reporting relationship. An organization chart of the emergency management team is shown in Figure 4.1.

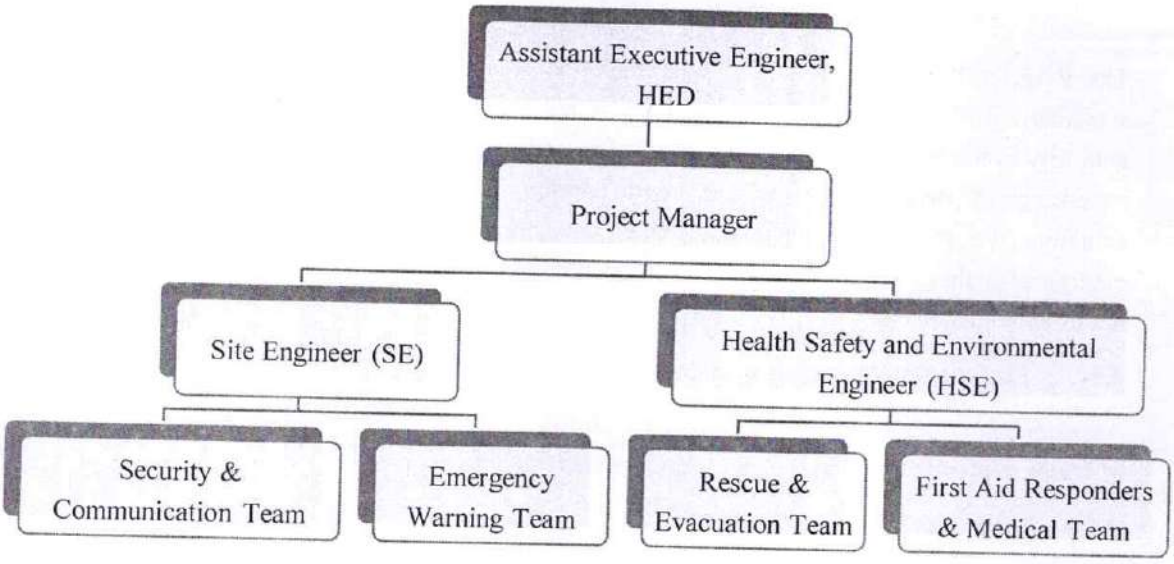


Figure 4.1: Organogram of Emergency Response Team for the Project

The emergency notification process in case of emergency situation is given in Figure 4.2.

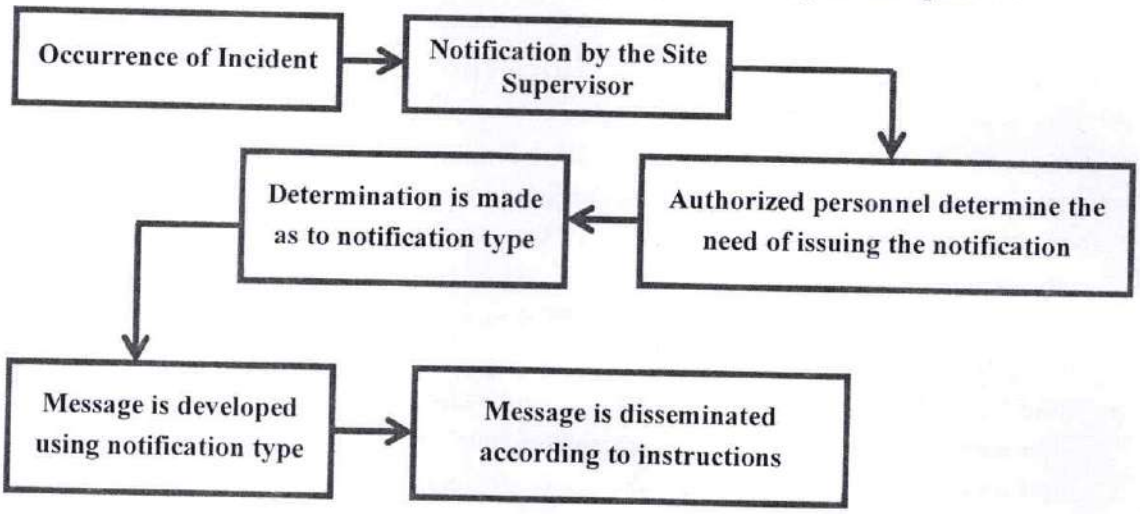


Figure 4.2: Emergency Notification Process

4.1.2 Roles and Responsibility of Emergency Response Team

The general roles and responsibilities of proposed emergency management personnel to prevent and mitigate an unfavorable event to minimize its adverse impact are:

- Look into the structural safety requirements for various hazards (fire, cyclone, etc.). Get the proposed structure assessed for the hazards identified and take prompt remedial measures, as required.
- Evaluation and updating of the RA&DMP at regular intervals (at least once a year, and after any significant disaster) to ensure that the plan is workable.
- Earmark fund arrangements for carrying out preparedness and mitigation measures.
- Declaring emergencies and implementing the emergency plan.
- Implementing evacuation procedures.

- Ensuring coordination with external emergency services (fire, police, ambulance) and utilities.
- Assessing and obtaining emergency services, supplies and equipment.
- Ensuring the safety of the labourers at all times during an emergency.
- Contacting, training and supervising volunteers.
- Documenting all aspects of the response/recovery procedures.
- Preparing post-emergency reports.

As emergency preparedness measures, the following services shall be made available at the site to ensure efficient implementation of the emergency response plan.

4.1.3 Emergency Control Centre

The Emergency Control Centre shall be established during the construction phase of the project that is equipped with following facilities:

- Copy of current on-site emergency plan
- Display of the name of site emergency controller
- Adequate and reliable communication facilities (phone, handset etc.)
- Site layout diagram with entry and exit routes / assembly points
- Directory of internal / external emergency phone numbers
- Fire extinguishers (Dry Chemical Powder (DCP) type / Foam Type / CO_2) on site
- A set of PPEs for each and every member of the construction team as required
- List of fire trained personnel
- Appropriate numbers of rescue ropes and high beam torches
- Drinking water

4.1.4 Firefighting Systems

It shall be ensured that the following firefighting systems are established in the site for proposed construction:

- Maintain clear access for emergency vehicles.
- Fire detection systems, including smoke and heat detectors, should be implemented to ensure early detection, while a comprehensive fire alarm system can alert personnel to emergencies.
- Portable fire extinguishers should be placed in accessible locations.
- Store flammable materials like fuels, solvents, and paints in designated, well-ventilated areas away from heat sources and the storage areas should be equipped with fire extinguishers.

4.1.5 Communication Services

Adequate provision of inter-communication telephones, public address system, emergency alert system and cellular phone-based communication shall be made to ensure safe communication works during emergency response planning.

A list of emergency contact numbers, including those for fire services, police, hospital etc., should be prominently displayed in proximity to the project site. This ensures prompt access to critical contact information for immediate reporting and response during an emergency.

4.1.6 External Emergency Contacts

The contact details of concerned authorities to be contacted in case of emergency like the nearest police station, fire station, hospital etc. are given in Table 4.1. These contact details shall be displayed in all prominent locations at the site. The details of nearest emergency facilities are given in Table 4.2.

Table 4.1: External Emergency Contacts

S. No.	Official / Service	Telephone Number
1.	District Disaster Management Cell Collectorate, Kasaragod	0499 4257700
2.	Additional District Magistrate (ADM), Kasaragod	0499 4255833
3.	District Collector, Kasaragod	0499 4256400
4.	Municipal Corporation Secretary, Kanhangad	0467 2204530
5.	District Medical Officer (DMO), Kasaragod	9946105497
6.	District Hospital, Kanhangad	0467 2217019
7.	Primary Health Centre, Ajanur, Kanhangad	0467 2204985
8.	Manzoor Hospital, Kanhangad	0467 220 2070
9.	District Police Chief, Kasaragod	9497996972
10.	Hosdurg Police Station, Kanhangad	94979 80922
11.	Fire & Rescue Station, Kanhangad	0467 2202101
12.	KSEB Section Chithari Office, Kanhangad	0467 2267049

Table 4.2: Nearest Police/Fire Stations and Hospitals

S. No.	Official / Service	Road Distance from Project Site (km)	Direction
Nearest Hospital			
1.	Primary Health Centre, Ajanur, Kanhangad	1.60	SE of Southern breakwater
2.	Manzoor Hospital, Kanhangad	3.20	E of Southern breakwater
Nearest Police Station			
1.	Hosdurg Police Station, Kanhangad	5.00	SE of Southern breakwater
Nearest Fire Station			
1.	Fire and Rescue station, Kanhangad	5.00	SE of Southern breakwater

4.1.7 Trainings and Capacity Building

To ensure the safety and preparedness of all personnel, a robust training and capacity-building plan shall be implemented. Each member of the construction and operations teams, shall be provided with PPE and trained in its proper use. Regular training sessions will cover essential topics such as safety procedures, emergency response, first aid, and fire evacuation. Designated staff, including a Health, Safety, and Environment (HSE) engineer or trained crew members, will be equipped to handle medical emergencies, with first aid kits and Cardiopulmonary Resuscitation (CPR) training readily available. Workers will also be informed about emergency contact lists to ensure swift communication in the event of casualties or accidents.

Emergency response plans, including evacuation routes, assembly points and fire safety protocols, shall be developed, displayed at key locations, and communicated to all workers. Fire detection and suppression systems, such as extinguishers and water tanks, shall be strategically installed, regularly maintained, and

supported by fire drills to ensure preparedness. Measures to manage worker fatigue, such as adequate breaks and monitoring work hours, will also be implemented to promote overall safety and efficiency. The site shall undergo regular inspections and risk assessments to identify potential hazards and ensuring effective response.

4.1.8 Community Involvement

Community involvement in Emergency Management Plan, ensures that local stakeholders are informed, prepared, and engaged in the project's safety measures. Establishing clear communication channels with the local community will help in disseminating emergency information, such as evacuation plans, safety procedures, and contact details for emergency services.

4.1.9 Budgetary Allocation for Emergency Management

The following equipment and measures are recommended for the proposed project based on the hazards identified. The budget allocation for this additional measure/ equipment is detailed in Table 4.3.

Table 4.3: Cost of Emergency Management Measures for the Project

S. No.	Disaster Management Measures	Capital Cost (In INR)	Recurring Cost/year (In INR)
Construction Phase			
1.	Conducting training sessions and disaster drills for construction workers	-	30,000
2.	Conducting awareness program for local community	-	30,000
3.	Establishing temporary safe zones for workers and materials	50,000	15,000
4.	Safety Officer	-	3,00,000
5.	PPE for workers (Helmets, gloves, safety boots, high-visibility vests, masks, life jacket etc.)	5,15,000	80,000
6.	Contingency fund for unforeseen emergencies or expenses	-	1,00,000
7.	Erecting display boards at the project site - 8 nos. ➢ Emergency contacts ➢ Diversion boards	35,000	5,000
	Budgetary Allocation for Construction Phase	***6,00,000***	***5,60,000***
Operation Phase			
8.	Regular inspections of structures	20,000	8,000
9.	Installation of CCTV	10,000	2,000
10.	Sign boards	15,000	5,000
	Budgetary Allocation for Operation Phase	***45,000***	***15,000***

Total estimated budget for Emergency Management Measures during the construction phase is INR 6,00,000 as capital cost and INR 5,60,000 per year as recurring cost. During operation phase the budgetary allocation as capital cost is INR 45,000 and recurring cost is estimated as INR 15,000 per year.

4.2 Site Safety Checklist

A safety checklist has been prepared that has to filled by a duly appointed representative of all sectors of staff involved in the construction site. The review and analysis of the checklist helps in evaluating the efficiency

of the Emergency Preparedness Plan and for timely updating the same. The checklist prepared is given in Table 4.4.

Table 4.4: Safety Checklist to be followed at Site

S. No.	Particulars	✓/X
1.	Have all workers been provided with and are they wearing the necessary PPE?	
2.	Are temporary structures, such as scaffolding and formwork, regularly inspected for stability and security?	
3.	Has each worker received proper training on natural hazards and emergency procedures?	
4.	Is there a comprehensive emergency evacuation plan in place?	
5.	Are well-stocked first aid kits readily available on-site, and do workers know their location and how to use them?	
6.	Have effective communication channels been established to keep workers informed about potential natural hazard threats and evacuation orders?	
7.	Is there a contingency plan for flooding or water-related risks due to proximity to water?	
8.	Are safe access and egress routes to higher ground clearly marked and kept clear of obstructions?	
9.	Have electrical connections and equipment been properly waterproofed to prevent electrical risks during hazards?	
10.	Are construction materials stored in elevated areas to prevent damage during a hazard?	
11.	Are regular site inspections being conducted to identify and address potential safety hazards?	
12.	Is there a competent supervisor overseeing safety compliance and ready to respond quickly to emergencies?	
13.	Are local authorities and emergency services familiar with the construction site and emergency protocols for quick response?	
14.	Will a thorough inspection of the construction site be conducted after a hazard event to assess damages and identify safety risks?	
15.	Have past hazard incidents been analyzed to learn from them and improve safety protocols?	

4.3 Post Disaster Recovery

If the proposed structures are affected by any disaster, the following measures shall be adopted for recovery.

- A qualified engineer should assess the structural integrity
- To prevent further damage or collapse, installation of shoring or supports, reinforcing critical parts of the structure.
- Implement safety measures like debris removal and utility repairs to ensure public safety and to minimize further disruptions.
- Review the RA&DMP after the disaster and update it accordingly based on lessons learned.

Chapter 5. Conclusions and Recommendations

5.1 Conclusions

- Effective disaster management is a comprehensive process that involves planning, coordination, and continuous improvement to protect the life and properties of users, local communities and the environment, and ensure sustainable development despite the occurrence of disasters.
- The natural hazards identified for the project are coastal hazards, flood, earthquake, drought, cyclone, lightning and epidemics. The anthropogenic hazards identified are accidents possible during construction phase and operation phase of the project.
- Following the implementation of mitigation measures, the risk levels for natural and anthropogenic hazards have significantly reduced. Coastal hazard and cyclone risk have decreased from high to medium, while risk of earthquake, drought and epidemics has dropped from medium to low. Risk of flood and lightning has dropped from medium (9) to medium (6). Likewise, anthropogenic hazards have seen a reduction in risk levels from high to medium, ensuring a safer and more resilient environment.
- The estimated budget for emergency management measures is INR 6,00,000 as capital cost with a significant portion allocated for the safety of the workers while recurring cost of INR 5,60,000 per year is allocated with significant portion for the expense of safety officer. During the operational phase, the capital cost is estimated as INR 45,000 while the recurring cost is estimated as INR 15,000 per year with a significant portion allocated for maintenance.

5.2 Recommendations

- Environmental design parameters shall be given utmost importance and the design shall be prepared and implemented as per the prevailing environmental parameters at the project location to reduce risks.
- Only trained personnel shall be deployed for the construction and all related works in the water body.
- Adequate safety measures must be taken to prevent accidents during construction and operation phase of the project.
- Close co-ordination with DDMA Kasaragod district shall be done, to obtain early warnings of any natural disasters.
- All emergency contact numbers shall be prominently displayed at all important locations.
- All the staff and technicians deployed at the site shall be trained in first aid and for handling emergency situations. Adequate number of first aid kits shall be available at the project site at all times.
- The site safety compliance checklist shall be filled by an assigned representative of all sectors of the staffs employed at the construction site to ensure and enhance efficiency of the DMP.

Adoption of site-specific mitigation measures will reduce the risks at the site and emergency preparedness will help in mitigating any possible hazard likely to occur. HED is committed to ensuring the safety and security of all workers at site, fisherman and nearby residents.

HTL, LTL, AND CRZ FOR THE PROJECT AREA PROPOSED FOR THE CONSTRUCTION OF AJANUR FISHING HARBOUR IN AJANUR GRAMA PANCHAYAT, KASARAGOD DISTRICT, KERALA

(As per CRZ Notification, 2019)



Prepared for

The Executive Engineer, Harbour Engineering Division,
Kasaragod - 671 121

NATIONAL CENTRE FOR EARTH SCIENCE STUDIES
Ministry of Earth Sciences, Government of India
Thiruvananthapuram - 695 011, Kerala

MAY 2025

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Ministry of Earth Sciences, Government of India, Thiruvananthapuram

DOCUMENTATION PAGE

1.	REPORT NUMBER	NCESS-CRZ-19-2025
2.	TYPE OF REPORT	CRZ STATUS REPORT
3.	TITLE	HTL, LTL, AND CRZ FOR THE PROJECT AREA PROPOSED FOR THE CONSTRUCTION OF AJANUR FISHING HARBOUR IN AJANUR GRAMA PANCHAYAT, KASARAGOD DISTRICT, KERALA
4.	PRINCIPAL INVESTIGATOR	Dr. REJI SRINIVAS
	INVESTIGATOR	Mr. VIMAL K C
	REVIEW EXPERTS	Dr. N. P KURIAN, Dr. AJIT KUMAR PATTNAIK, Dr. H.B. CHAUHAN
	PROJECT STAFF	Mrs. ANUSHA A, Mr. SACHIDANANDAN T L, Mr. AKHIL CHANDRAN V, Mrs. KRISHNA PRIYA. S, Dr. ARUN T J, Mr. ASWIN THILAKAN, Mrs. LINCY SUDHAKARAN
5.	KEYWORDS	Coastal Regulation Zone (CRZ), CRZ Notification (2019), High Tide Line (HTL), Low Tide Line (LTL), Hazard Line, CRZ IA, CRZ IB, CRZ II, No Development Zone (NDZ), CRZ IIIA, CRZ IIIB, CRZ IVA, CRZ IVB and Coastal Zone Management Plan (CZMP).
6.	ABSTRACT	The Executive Engineer, Harbour Engineering Division, Kasaragod requested the National Centre for Earth Science Studies (NCESS), Ministry of Earth Sciences, Government of India, Thiruvananthapuram, an agency authorized by the Government of India to delineate HTL and LTL to provide CRZ Maps and Status Report to facilitate CRZ clearance for the proposed construction of Ajanur fishing harbour in Ajanur Grama Panchayat, Kasaragod district, Kerala. According to the approved CZMP (as per CRZ Notification 2019), part of the project site is located in Survey Numbers 176 and 187 in Ajanur Village, Ajanur Grama Panchayat, Hosdurg Taluk, Kasaragod District, Kerala. The majority of the proposed project site is situated on the Lakshadweep Sea and Poramboke land on the outskirts of Ajannur Village. As per the project layout and DPR provided by the project proponent, the proposed construction of Ajanur Fishing Harbour consists of a north breakwater of 1150 m in length, and south breakwater of 425 m length, a north training wall of 435 m in length, a wharf, auction hall, parking area, toilet, water supply arrangements, canteen/gearshed/shop/rest room, gate & gatehouse, internal road, boat building & repairing yard, reclamation bund, packing container storage space, office cum surveillance camera room, ETP, rainwater harvesting, compound wall, approach road, basin dredging, berthing wharf and dredging near training wall. The project site also includes the existing buildings of the fish landing centre, which comprises the net mending building, an auction hall, and a toilet block. The total estimated cost of the project, including all components, is Rs. 20,000 lakhs. The proposed project area is directly accessible via the Ajanur Fish Landing Centre Coastal Road. Additionally, it can be reached through Crescent Road, which runs parallel to the seacoast and connects with Ajanur Fish Landing Centre Coastal Road. The project area falls within the Coastal Regulation Zone of the Lakshadweep Sea and Chithari River and is part of Map No. KL - 78 (Sheet No. D 43 V 3/SW) of the CZMP of Kerala (approved in 2024) prepared as per the CRZ Notification, 2019. The CRZ map is prepared in 1:4000 scale cadastral base map with survey plot information. The proposed project site has High Tide Line on the seaside and the riverside. According to the approved CZMP (as per CRZ Notification, 2019) map, ecologically sensitive areas such as mangroves are not depicted in the project site or close vicinity. However, during the field survey, mangrove patches were observed within the project area and its vicinity along Chithari Riverbanks, which have been incorporated into the CRZ map. Along the coastline, dense settlements are observed in the vicinity of the project area, especially the southern side of the project site, and a sandy beach is observed on the seaward side of the Fish Landing Centre Road. According to the approved Coastal Zone Management Plan (CZMP) of Kerala as per CRZ Notification 2019, part of the project area is located in Ajanur Grama Panchayat of Ajanur Village (other part of the project area located in the Lakshadweep Sea and Poramboke land), which is a category-1 legally designated Urban Area; hence, it is categorized as CRZ II. The proposed project activities fall within the CRZ IA (Mangroves), CRZ IB (Intertidal Zone), CRZ II, CRZ IVA (Lakshadweep Sea), and CRZ IVB (Chithari River) categories. The existing FLC Buildings fall within the CRZ IB (Intertidal Zone) and CRZ II categories. As per CRZ Notification 2019, Paragraph 5.1.2, activities shall be regulated or permissible in CRZ IB areas as under Clause (i), ie. "land reclamation, bunding, etc. shall be permitted only for activities such as (Sub-clause (a)) foreshore facilities like ports, harbours, jetties, wharves, quays, slipway, bridges, hover ports for coast guard, sea links, etc.," and Clause (ii) ie. "the activities related to waterfront or directly needing foreshore facilities such as ports and harbours, jetties, quays, wharves, erosion control measures, breakwaters, pipelines, lighthouses, navigational safety facilities, coastal police stations, Indian coast guard stations and the like". As per CRZ Notification 2019, Paragraph 5.2, Clause (i), the activities permitted in CRZ IB shall also be permissible in CRZ-II, as applicable. As per CRZ Notification 2019, Paragraph 5.4, activities shall be permitted and regulated in CRZ IV areas as under Clause (ii), ie. "land reclamation, bunding, etc. to be permitted only for activities such as (Sub-clause (a)) foreshore facilities like ports, harbours, jetties, wharves, quays, slipways, bridges, sea links and hover pots for the coast guard, etc., and Clause (iii) ie. "activities related to waterfront or directly needing foreshore facilities, such as ports and harbours, jetties, quays, wharves, erosion control measures, breakwaters, pipelines, navigational safety facilities and the like".
7.	DISTRIBUTION STATEMENT	NOT FOR CIRCULATION
8.	PROJECT PROPONENT	The Executive Engineer, Harbour Engineering Division, Kasaragod - 671 121

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HTL, LTL, AND CRZ FOR THE PROJECT AREA PROPOSED FOR THE CONSTRUCTION OF AJANUR FISHING HARBOUR IN AJANUR GRAMA PANCHAYAT, KASARAGOD DISTRICT, KERALA

1.0 Introduction

The Harbour Engineering Department, Kasaragod Division, Government of Kerala, proposes to construct a Fishing Harbour at the Ajanur seacoast, located south of the Chithari River mouth in Ajanur Village, Ajanur Grama Panchayat, Hosdurg Taluk, Kasaragod. The Executive Engineer, Harbour Engineering Division, Kasaragod, requested National Centre for Earth Science Studies (NCESS), Ministry of Earth Sciences, Government of India, Thiruvananthapuram, an agency authorised by the Government of India to delineate HTL and LTL, to provide CRZ Map and Status Report to facilitate CRZ clearance for the proposed construction of Fishing Harbour at Ajanur near Chithari River in Ajanur Grama Panchayat, Kasaragod District, Kerala. According to the approved CZMP as per CRZ Notification 2019, part of the project area (other part of the project area located in the Lakshadweep Sea and Poramboke land) is located in Survey Numbers 176 and 187 in Ajanur Village, Ajanur Grama Panchayat, Hosdurg Taluk, Kasaragod District, Kerala. The proposed harbor construction site is within the Coastal Regulation Zone (CRZ) of Lakshadweep Sea, and Chithari River as per the Coastal Zone Management Plan (CZMP) of Kerala prepared as per CRZ Notification, 2019 and approved in 2024 (hereinafter referred to as CZMP of Kerala).

As outlined in the Detailed Project Report (DPR) provided by the project proponent, Ajanur is a well-known fishing village located in the Kasaragod District. A variety of fishing crafts operate from this area. Both the fishermen and the local fishery industry are consistently advocating for further development of the region. In addition to requests for the construction of a new fishing harbor, there are ongoing demands to make the Chithari River mouth permanent and to prevent the formation of sandbars at its entrance. The mouth of the Chithari River is migratory in nature and often becomes completely closed during the summer months. This closure leads to flash floods in the coastal areas where the estuary drains into the sea, resulting in disaster for people living upstream. The situation worsens due to the river's catchment area being densely populated with urban developments. The river discharge is hindered by the sandbars formed by the coastal marine processes, which necessitates annual human intervention to reopen the river mouth before the monsoon season. Additionally, the

migratory nature of the river mouth has shifted significantly to the south in recent years, causing damage to the auction halls and other infrastructure established for fisheries in the area.

The NCESS has taken up the preparation of CRZ Maps and Status Report by demarcating the High Tide Line (HTL), Low Tide Line (LTL), and Coastal Regulation Zone (CRZ) for the proposed construction of Ajanur Fishing Harbour in Ajanur Grama Panchayat, Kasaragod District. The CRZ Maps and Status Report are prepared based on the field investigation carried out during November 2022, March 2024, and February 2025. The proposed construction site and its vicinity are encompassed in Map No. KL - 78 (Sheet No. D 43 V 3/SW) of the CZMP of Kerala prepared as per the CRZ Notification, 2019 and approved in 2024. In the CZMP, the HTL, LTL and CRZ are demarcated in 1:25000 scale. However, the Ministry of Environment Forests and Climate Change (MoEF&CC), Govt. of India has directed the project proponents to get CRZ Maps prepared in cadastral scale for the project area so that more details are made available. The CRZ Notification 2019 directs to prepare local level CZM/CRZ maps onto cadastral base in 1:3960 or nearest scale to facilitate implementation of Coastal Zone Management Plans. Accordingly, the CRZ Map is prepared in cadastral scale (1:4000) based on field investigations.

The demarcation of the HTL and LTL for the project area has been carried out following the guidelines as per the CRZ Notification 2019. The Coastal Zone Management Plan of Kerala has also been referred for accomplishing the work. The site being on the seacoast of the Lakshadweep Sea and Chithari River, the development activities regulated as provided in the Coastal Regulation Zone (CRZ) Notification, 2019, are applicable for the proposed construction of Ajanur Fishing Harbour.

2.0 Proposed Project Activities

As per the project layout and DPR provided by the project proponent, the proposed construction of Ajanur Fishing Harbour consists of a north breakwater of 1150 m in length, and south breakwater of 425 m length, a north training wall of 435 m in length, a wharf, auction hall, parking area, toilet, water supply arrangements, canteen/gearshed/shop/rest room, gate & gatehouse, internal road, boat building & repairing yard, reclamation bund, packing container storage space, office cum surveillance camera room, ETP, rainwater harvesting, compound wall, approach road, basin dredging, berthing wharf and dredging near training wall. The

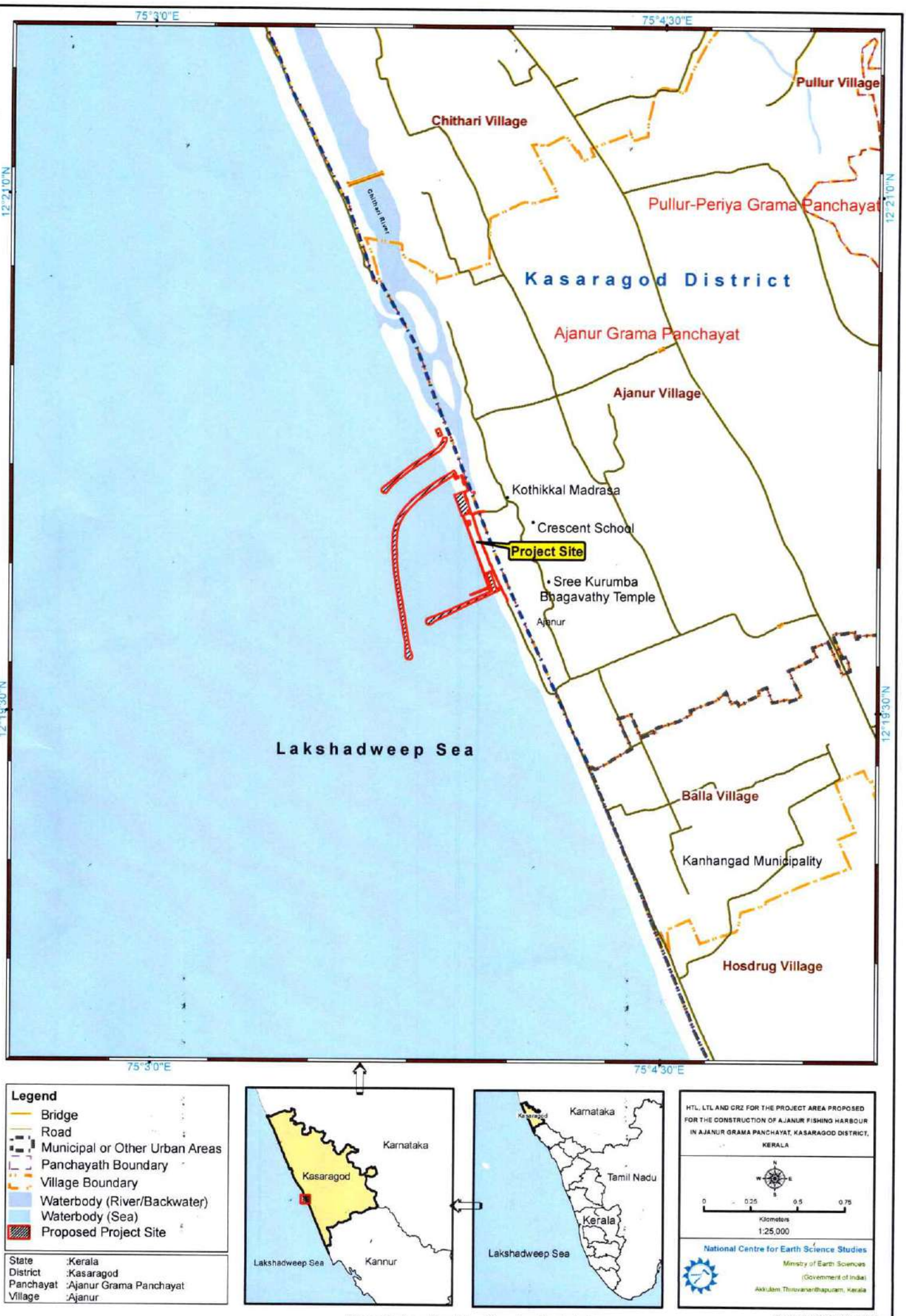


Figure 1: Location Map Showing Project Area

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project site also includes the existing buildings of the fish landing centre, which comprises the net mending building, an auction hall, and a toilet block. The total estimated cost of the project, including all components, is Rs. 20,000 lakhs.

3.0 Location

The proposed site for the Ajanur Fishing Harbour is situated along the Ajanur seacoast, south of the Chithari River mouth, in Ajanur Village, within the Ajanur Grama Panchayat, Hosdurg Taluk, Kasaragod. Ajanur is a coastal village bordered on the west by the Lakshadweep Sea and the Chithari River. To the north and south, it is bordered by Chithari and Balla Villages, respectively. According to the approved CZMP (as per CRZ Notification 2019), part of the project site is located in Survey Numbers 176 and 187 in Ajanur Village, Ajanur Grama Panchayat, Hosdurg Taluk, Kasaragod District, Kerala. The majority of the proposed project site is situated on the Lakshadweep Sea and Poramboke land on the outskirts of Ajannur Village. The northern part of the proposed project site is located on the Chithari River spit (sandbar), while the southern part of the site, along the seacoast, is protected by seawalls. Along the coastline, dense settlements are observed in the vicinity of the project area, especially the southern side of the project site, and a wide sandy beach is observed on the seaward side of the Fish Landing Centre Road. The proposed project area is directly accessible via the Ajanur Fish Landing Centre Coastal Road. Additionally, it can be reached through Crescent Road, which runs parallel to the seacoast and connects with Ajanur Fish Landing Centre Coastal Road (see Fig. 1, Location Map). The project area is located between 12°19'38.831"N to 12°20'19.405"N Latitude and 75°3'40.226"E to 75°4'2.726"E Longitude.

4.0 Objectives

The objectives of the study are:

- Delineation of the HTL, LTL, and other CRZ lines in the cadastral map (1:4000 scale) of the project area and its vicinity for the proposed construction of Ajanur Fishing Harbour in Ajanur Grama Panchayat, Kasaragod District, Kerala.
- Categorization of Coastal Regulation Zone (CRZ) for the project area and its vicinity with respect to the approved CZMP of Kerala State and CRZ Notification, 2019.
- Preparation of the CRZ Categories Map showing a 7 Km radius area around the project site on 1:25000 scale.

- Preparation of CRZ Map and Status Report based on field observations, approved CZMP of Kerala, available spatial data, and the guidelines provided in the CRZ Notifications 2019.

5.0 Coastal Regulation Zone (CRZ)

All developmental activities in the CRZ are regulated through the CRZ Notification 2019. The Government of India Notification [S.O. 37 (E) dated 18.01.2019] under Section 3(1) and Section 3(2) (v) of the Environment (Protection) Act, 1986 and Rule 5(3) (d) of Environment (Protection) Rules, 1986 has redefined the CRZ. Accordingly, the CRZ has been declared as 'the coastal stretches of the country and the water area up to its territorial water limit excluding the islands of Andaman and Nicobar and Lakshadweep and the marine areas surrounding these islands up to its territorial limit' (CRZ Notification, 2019). The CRZ Consists of:

1. Land area from the High Tide Line (HTL) to 500 m on the landward side along the seafront.
2. Land area between the HTL to 50 m or width of the creek whichever is less on the landward side along the tidal-influenced water bodies that are connected to the sea and the distance up to which development along such tidal-influenced water bodies is to be regulated shall be governed by the distance up to which tidal effects are experienced which is determined based on salinity concentration of 5 parts per thousand (ppt) measured during the driest period of the year and distance up to which tidal effects are experienced should be clearly identified and demarcated accordingly in the Coastal Zone Management Plans (CZMPs). Tidal influenced water bodies mean the water bodies influenced by tidal effects from the sea in the bays, estuaries, rivers, creeks, backwaters, lagoons, ponds that are connected to the sea.
3. The ecologically sensitive area and the geomorphological features which play a role in maintaining the integrity of the coast.
4. Land area between High Tide Line (HTL) and Low Tide Line (LTL), which will be termed as the Intertidal Zone (ITZ).
5. Water and the bed area between the LTL to the territorial water limit (12 Nm) in the case of sea (CRZ IVA) and the water and the bed area between LTL at the bank to the LTL on the opposite side of the bank, of tidal influenced water bodies (CRZ IVB).

6. Land area falling between the hazard line and 500 m from HTL on the landward side, in case of seafront and between the hazard line and 50 m line in case of tidal influenced water body. The word' hazard line' denotes the line demarcated by Ministry of Environment Forests and Climate Change (MoEF&CC) through the Survey of India (SoI) taking into account tides, waves, sea level rise and shoreline changes.

For the purpose of conserving and protecting the coastal areas and marine waters, the CRZ Notification 2019 categorizes Coastal Regulation Zones as CRZ I (CRZ IA and CRZ IB), CRZ II, CRZ III (CRZ IIIA and CRZ IIIB), and CRZ IV (CRZ IVA and CRZ IVB) based on whether the area is ecologically sensitive, developed, undeveloped, or water body and its bed. Ecologically sensitive and important areas are CRZ IA, and the intertidal zone is CRZ IB. Major CRZ IA categories include mangroves, corals and coral reefs, sand dunes, Biologically active mudflats, National Parks, marine parks, sanctuaries, reserve forests, wildlife habitats and other protected areas under the provisions of Wildlife (Protection) Act, 1972 (53 of 1972), Forest (Conservation) Act, 1980 (69 of 1980) or Environment (Protection) Act, 1986 (29 of 1986) including Biosphere Reserves salt marshes, turtle nesting grounds, horseshoe crab habitats, sea grass beds, nesting ground of birds, areas or structures of archaeological importance and heritage sites and Eco-Sensitive Zone [F.No.12/1/2019-IA.III (E-122245) dated: 26th October, 2021]. In case the mangrove area is more than 1000 m^2, a buffer of 50 m along the mangroves shall be provided and such area shall also constitute CRZ IA. Mangroves in Government land shall be protected based on a detailed plan to be prepared by the concerned State Governments or Union territory administrations and in case the mangrove area is more than 1000 m^2 a buffer of 50 m along the periphery of mangrove area shall be provided. Mangroves in private land will not require a buffer zone, but in such areas, mangroves shall be protected. CRZ IB is the area between Low Tide Line and High Tide Line (Inter Tidal Zone). The developed land areas up to or close to the shoreline, within the existing municipal limits or in other legally designated urban areas where the built-up area is more than 50% are categorized as CRZ II. Rural/undeveloped land areas that are relatively undisturbed belong to CRZ III. Densely populated CRZ-III areas, where the population density is more than 2161 per square kilometer as per 2011 census base, shall be designated as CRZ IIIA and in CRZ IIIA, area up to 50 m from the HTL on the landward side shall be earmarked as the 'No development Zone (NDZ)'. All other CRZ-III areas with population density of less than 2161 per square kilometer, as per

2011 census base, shall be designated as CRZ-III B and in CRZ-III B, the area up to 200 m from the HTL on the landward side shall be earmarked as the 'No Development Zone (NDZ)'. The water area and the sea bed area between the Low Tide Line up to 12 nautical miles on the seaward side shall constitute CRZ-IV A. CRZ-IV B areas shall include the water area and the bed area between LTL at the bank of the tidal influenced water body to the LTL on the opposite side of the bank, extending from the mouth of the water body at the sea up to the influence of tide, i.e., salinity of five parts per thousand (ppt) during the driest season of the year.

As per the Amendment to the CRZ Notification 2019, gazette notification no. S.O. 1422 (e) dated 1st May, 2020 & no. S.O. 4886 (e) dated 26th November 2021, In case there exists a bund or a sluice gate constructed in the past, prior to the date of notification issued vide S.O. 114 (E) dated 19th February 1991, the HTL shall be restricted up to the line long along the bund or the sluice gate and in such a case, area under mangroves arising due to saline water ingress beyond the bund or sluice gate shall be classified as CRZ-IA irrespective of the extent of the area beyond the bund or sluice gate. Such areas under mangroves shall be protected and shall not be diverted for any developmental activities.

The CRZ Notification of 2019 has also defined Critical Vulnerable Coastal Areas (CVCA), which includes Sundarbans in West Bengal and other identified ecologically sensitive areas as under Environment (Protection) Act, 1986 in which Vembanad in Kerala is also included. The Ministry of Environment & Forests, Govt. of India has issued the CRZ Notification on 18th January 2019 (CRZ Notification 2019) in supersession of CRZ Notification 2011 except as respects things done or omitted to be done before such supersession.

All the inland islands in the coastal backwaters and islands along the mainland coast shall be covered under the notification, 2019 and the CRZ of 20 m from the HTL on the landward side shall uniformly apply to such islands. The islands demarcated in Kerala as mainland coast islands and inland islands in the coastal backwaters need to have Integrated Island Management Plans (IIMPs), as applicable to smaller islands in Lakshadweep and Andaman & Nicobar, as per Island Protection Zone Notification, 2011 number S.O. 20(E), dated the 6th January, 2011 to be formulated by the Kerala State. The islands are buffered with 50 m or width of the creek whichever is less till the IIMPs are framed and 20m CRZ line landward of HTL will be considered only after IIMP is implemented.

6.0 CRZ for the State of Kerala

The CRZ Notification 2019 is published on 18th January 2019, issued in supersession of CRZ Notification 2011 (except as respects things done or omitted to be done before such supersession). Coastal Zone Management Plan of Kerala prepared as per CRZ Notification 2019 was approved by Ministry of Environment and Forest and Climate Change (MoEF&CC) on 16th October 2024 (F. No. IA3-12/7/2021-IA.III (E-153017) dated 16-10-2024). The approved CZMP has areas covered under CRZ-I (CRZ IA & CRZ IB), CRZ II, CRZ III (CRZ IIIA & CRZ IIIB) and CRZ IV (CRZ IVA & CRZ IVB) categories.

According to the provision in CRZ Notification 2019 (Amendment to the CRZ Notification 2019, gazette notification no. S.O. 1422 (e) dated 1st May 2020 & no. S.O. 4886 (e) dated 26th November 2021), the HTL along some stretches of Kerala shall be restricted up to the bunds or sluice gates constructed in the past and prior to the date of notification issued vide S.O. 114 (E) dated 19th February 1991. The areas under mangroves arising due to saline water ingress beyond the bund or sluice gate shall be classified as CRZ-IA, such areas under mangroves shall be protected and shall not be diverted for any developmental activities.

The 45th meeting of the National Coastal Zone Management Authority (NCZMA) held on 01.09.2022, has recommended Category I Coastal Grama Panchayats in the State of Kerala notified before the issue of CRZ Notification, 2019 be considered as 'Other Legally Designated Urban Areas' as per the CRZ Notification, 2019 i.e., existing as on the date of issue of CRZ Notification, 2019. These category-I Panchayats (66 Grama Panchayats) met the criteria of built-up area and developmental infrastructure be considered for classification as falling under CRZ II area (Ref: No:08/A2/2019/KCZMA dated 03.09.2022). However, the areas specified by the Department of Atomic Energy in the afore mentioned coastal Panchayats shall not be categorized as CRZ II and shall be classified as CRZ III A or CRZ III B as per the norms and such areas shall be contiguous in nature" (Ref no. Office Memorandum File No. J-17011/18/96- IA.III (Vol.VI) dated 02.09.2022 from Ministry of Environment Forest and Climate Change).

The CRZ Notification 2019 categorizes areas that are ecologically sensitive identified based on the geomorphological features (which play a role in the maintaining the integrity of the coast) such as mangroves, turtle nesting sites, archaeologically important and heritage sites

etc., as CRZ IA. Mangroves shall be protected, and if the mangrove area is more than 1000 m2, a buffer zone of 50 m along the periphery of the mangrove area shall be provided for government lands. The Intertidal Zone is the area between the Low Tide Line and the High Tide Line, constituting CRZ IB. As per the CZMP of Kerala based on CRZ Notification 2019, the existing Municipalities, Corporations, and legally designated urban areas (except those categorized as CRZ I and CRZ IV) are categorized as CRZ II, and the rest of the relatively undisturbed Grama Panchayats have been categorized as CRZ III. CRZ III has been further classified in to CRZ IIIA and CRZ IIIB based on population density. Densely populated CRZ-III areas, where the population density is more than 2161 per square kilometer as per 2011 census base, have been designated as CRZ IIIA and in CRZ IIIA, area up to 50 m from the HTL on the landward side shall be earmarked as the 'No development Zone (NDZ)'. All other CRZ-III areas with population density of less than 2161 per square kilometer, as per 2011 census base, have been designated as CRZ-IIIB and in CRZ-IIIB, the area up to 200 m from the HTL on the landward side have been earmarked as the 'No Development Zone (NDZ)'. CRZ applies to the land area from HTL to 50 m or width of the creek, whichever is less on the landward side along the tidal influenced water bodies that are connected to the sea. CRZ IV is water and the bed area between the LTL and the territorial water limit (12 Nm) in the case of sea (CRZ IVA) and the water and the bed area between LTL at the bank and the LTL on the opposite side of the bank of tidal influenced water bodies (CRZ IVB).

The 'Hazard Line' has been demarcated in the approved CZMP of Kerala based on CRZ Notification, 2019. In view of the unique coastal systems of backwater islands and islands along the mainland coast, along with space limitations in such coastal stretches, CRZ of 20 m from the HTL on the landward side shall uniformly apply to such islands. However, it will be implemented only after the approval of IIMP of the particular Island.

The CRZ Notifications of 2019 has also defined Vembanad Backwaters as one among the Critically Vulnerable Coastal Areas (CVCA) for which development activities need to be within the framework of an approved ICZMP. The notified port limits are incorporated in the approved CZMP of Kerala as per CRZ Notification 2019.

7.0 Approach and Methodology

Coastal geomorphology and ecosystems of the project area have been studied-using Survey of India Toposheets and high-resolution Satellite images. Topographic sheets and Satellite images came in handy in capturing diverse coastal ecosystems in the project area and its vicinity as baseline information prior to field investigations. The approved CZMP of Kerala was referred to ascertain the applicability of site-specific coastal regulation criteria.

Cadastral maps in 1:3960 scale with survey plot information have been used as the base map on which the project layout has to be superimposed. A field investigation was conducted to capture the ground details. Collateral cadastral features- unambiguous locations identifiable both on the ground and in the cadastral maps, such as survey plot boundary junctions, survey stones, canal crossing, bridges, culverts, etc., are used as Ground Control Points (GCP). Cadastral maps were georeferenced with precise geo-coordinates measured using GPS at pre-identified GCPs to collate spatial data onto the GIS platform. Planimetric standards were met to maintain the accuracy of measurements. UTM projection on to WGS 84 datum has been adopted for appropriate GIS composition. Being plotted in cadastral maps of 1:4000 scale, the HTL and CRZ boundaries are locatable in the field with respect to survey plots with adequate accuracy.

Key elements of the general approach followed in the study are:

- To carry out field investigation for delineating HTL and LTL on the cadastral base maps of the project area and its vicinity based on CRZ Notification 2019.
- To verify the approved CZMP of Kerala and identify CRZ areas.
- To gather information on the status of ecosystems (such as mangroves, tidal flats, sand dunes, etc.) in the project area and its vicinity along the seacoast of Lakshadweep Sea.
- To observe and record geomorphologic signatures for identifying HTL and map the distance to HTL with respect to concerned survey plots.
- To prepare the CRZ map delineating the HTL, LTL, and CRZ in cadastral scale, enabling to locate the HTL and other regulation lines precisely in the field.

- To prepare the CRZ Map and Status Report based on the field investigation, project layout, approved CZMP of Kerala, and CRZ Notification 2019.

8.0 Data Source

Different sets of data were used to compile the final map and prepare the CRZ report. The principal data sources are listed below:

i. Survey of India Toposheets

ii. High-resolution satellite imageries

iii. Timeline Google images of the area

iv. Cadastral maps

v. Approved CZMP of Kerala State as per CRZ Notification, 2019

vi. Hydrographic charts of the Naval Hydrographic Office

vii. Field mapping

9.0 Influence of Tidal Action

Coastal Zone Regulations are applicable to the seacoast water and bed area up to territorial water limit (12 Nautical miles) and banks and water and bed area of waterbodies influenced by tidal action. Therefore, tidal range is an important parameter that decides the extent of CRZ along rivers and backwaters. It also determines the reach of the 'highest water line during the spring tide'. Kasaragod coast is of micro-tidal nature. Tidal heights with respect to Chart Datum (CD) pertaining to Kasaragod, as provided by the Navel Hydrographic Office, Dehradun (NHO 1977), are given below.

Table 1. Tidal heights with respect to Chart Datum (CD) pertaining to Kasaragod.

Tide condition at Kasaragod	Water Level Height w.r.t. CD (m)
Mean Higher High Water	1.43
Mean Lower High Water	1.29

Mean Sea Level	0.98
Mean Higher Low Water	0.87
Mean Lower Low Water	0.39

As can be seen from the above table, the Mean Lower Low Water and Mean Higher High Water are 0.39 m and 1.43 m respectively. The distance up to which development along bays, estuaries, creeks and backwaters is regulated under CRZ depends on the landward extent of tidal influence. The distance up to which tidal influence is experienced is fixed based on salinity concentration of 5 parts per thousand measured during the driest period of the year (CRZ Notifications 2011). The same for the Chithari River, a tidal river, was inferred from the Coastal Zone Management Plan of Kerala. The Chithari River debouches into the Lakshadweep Sea at Ajanur, which is located immediately north of the project site.

10.0 Field Investigation

The MoEF&CC guidelines in CRZ Notification, 2019 stipulate that the HTL/LTL be identified based on coastal geomorphologic signatures in the field/satellite imageries/aerial photographs. Therefore, delineation of the HTL and LTL and identification of Coastal Regulation Zones for the project area and its vicinity were carried out based on geomorphic and other relevant signatures such as landward monsoonal berm crest, rocks, headlands, cliffs, seawalls or revetments or embankments, permanent vegetation line, ecologically sensitive areas (mangroves), intertidal areas and developed or undeveloped areas.

Field investigations were carried out in November 2022, March 2024, and February 2025. A DISTOPRO laser meter was used for precision distance measurements. Trimble- handheld GNSS receiver of model 'TDC 600' and Brunton compass were used for obtaining the ground positions. Cadastral/Village map of 1:5000 scale of Ajanur Village pertaining to the project site and its vicinity, procured from the Survey Department was used as the base map. HTL and LTL, known points, roads positions and bridges were marked using line/point features captured using high precision GNSS receiver. Photos depicting the morphology and the landuse pattern of the project area, and its vicinity were taken. An appraisal of existing landuse/landform in the project area was carried out to identify the existence of any ecologically sensitive areas and

areas or structures of archaeological importance/heritage sites to be categorized as CRZ IA. The CZMP of the Kerala, the CRZ Notification 2019 ,and the plan of the site given by the project proponent have been referred for CRZ categorization in addition to a detailed appraisal of existing landuse pattern in the project area.

11.0 Geomorphology and Landuse of the Project Area and its Vicinity

A detailed appraisal of the ecosystems and existing landuse in the project area and its vicinity were carried out to help the categorization of the regulation zones pertaining to sensitive and important coastal ecosystems. Apart from the field investigation, Survey of India topographic maps and very high-resolution satellite imageries of the area were also used for the same wherever required. The project area for the proposed construction of Fishing Harbour at the Ajanur seacoast, is located south of the Chithari River mouth in Ajanur Village, Ajanur Grama Panchayat, Hosdurg Taluk, Kasaragod. Ajanur is a coastal village bordered on the west by the Lakshadweep Sea and the Chithari River. The northern part of the proposed project site is located on the Chithari River spit (sandbar), while the southern part of the site, along the seacoast, is protected by seawalls in some stretches. During the field survey, it was observed that the northern side of the project site features a 120 m wide sandbar formation, the middle section has a 25 m wide beach, and the southern side contains a 40 m wide beach.

The Chithari basin encompasses the watersheds of the Kalnad, Bakel, and Chithari Rivers. The Chithari River is formed by several rivulets that originate from Cherambe, Tayakolam, and Pullur. These rivulets flow together to create a backwater before emptying into the Lakshadweep Sea. The coastal morphology of the Chithari River mouth is highly undulating in nature. The migration of the river mouth and the formation of the sandbar occur seasonally. During the summer, the river mouth completely closes, which adversely affects the fishing community and residents living along the banks of the Chithari River. Therefore, annual human intervention is necessary to reopen the river mouth before the monsoon season. The proposed construction of Ajanur Fishing Harbour may change the coastal morphology along the shoreline and river mouth.

Along the coastline, dense settlements are observed in the vicinity of the project area, especially the southern side of the project site, and a sandy beach is observed on the seaward side of the Fish Landing Centre Road. The proposed project area is directly accessible via the Ajanur Fish

Landing Centre Coastal Road. Additionally, it can be reached through Crescent Road, which runs parallel to the seacoast and connects with Ajanur Fish Landing Centre Coastal Road. The Kasaragod district can be divided into three distinct physiographical units: the coastal plains, the midlands, and the eastern highland regions. The coastal plains form the lowland areas adjacent to the Lakshadweep Sea. Topographically, the project area is a plain land and mixed tree crops with settlements dominate the landuse pattern in this area. The soil nature observed is generally coastal alluvial soil. The existing structures, such as the net mending building, auction hall, and toilet block, are located within the project site. Sparse mangroves are found along the Chithari Riverbank at the northeastern boundary of the project site.

12.0 Identification of HTL, LTL and CRZ

HTL is the line on the land, up to which the highest water line reaches during the spring tide. The sea level thus formed due to the combined effect of spring tide and wave set up gives the line of maximum reach of water on the land. The conventional definition of the lowest low water level and the resultant low water line during spring tide has been taken as the Low Tide Line (LTL). The HTL/LTL has been identified based on the coastal geomorphologic signatures in the field and also by referring to satellite imageries/aerial photographs following the guidelines of MoEF&CC. The landward of monsoonal berms, embankments, cliffs, rocks, seawall, permanent vegetation line, intertidal zones and mangroves have been considered for identifying the HTL. Once the HTL/LTL is identified, the distances to these are measured with respect to the survey plot boundaries identified in the field. An appraisal of existing landuse/landform in the project area is carried out to determine the ecologically sensitive and important areas to be categorized as CRZ IA present in the study area. The approved CZMP of Kerala has also been referred for CRZ categorization.

13.0 HTL/LTL and CRZ for the Project Area

The project area for the proposed construction of Ajanur Fishing Harbour is located within the Coastal Regulation Zone of the Lakshadweep Sea and Chithari River. The proposed site for the Ajanur Fishing Harbour is situated along the Ajanur seacoast, south of the Chithari River mouth, near the existing Ajanur Fish Landing Centre. The proposed project site has a High Tide Line on the seaside and the riverside. The seaward side of the High Tide Line is along the line of permanent vegetation, second monsoonal berms, the landward end of the concrete

embankment, and the landward end of the seawall. There are no adequately constructed embankments along the Chithari Riverbanks in the project area or its vicinity; only earthen embankments and vegetation are to be seen. The river side of the High Tide Line at the project site is along the line of permanent vegetation/earthen embankment.

The LTL is the lowest low water level resulting from the lowest spring tide. The Low Tide Line, seaward of the foreshore, is inferred from the topographical sheet and field measurements using GPS. LTL is also demarcated along the banks of Chithari River. Along the coastline, dense settlements are observed in the vicinity of the project area, especially the southern side of the project site, and a sandy beach is observed on the seaward side of the Fish Landing Centre Road. During the field survey, it was observed that the northern side of the project site features a 120 m wide sandbar formation, the middle section has a 25 m wide beach, and the southern side contains a 40 m wide beach. The project site is directly accessible via the Ajanur Fish Landing Centre Coastal Road.

According to the approved CZMP (as per CRZ Notification, 2019) map, ecologically sensitive areas such as mangroves are not depicted in the project site or close vicinity. However, during the field survey, mangrove patches were observed within the project area and its vicinity along Chithari Riverbanks, which have been incorporated into the CRZ map. Other ecologically sensitive areas such as turtle nesting grounds, areas or structures of archaeological importance and heritage sites, etc., which are categorised as CRZ IA, are not found in the project area or in its close proximity.

The intertidal area found along the seacoast and Chithari Riverbanks between the High Tide Line and Low Tide Line is CRZ IB. Along the seacoast, the CRZ extends landward from the HTL up to a distance of 500 m. The water and bed area from the LTL up to the territorial water limit (12 Nautical miles) in the case of seacoast is CRZ IVA. The water and the bed area of the river located to the north and east of the project site are CRZ IVB. According to the approved Coastal Zone Management Plan (CZMP) of Kerala as per CRZ Notification 2019, part of the project area is located in Ajanur Grama Panchayat (Ajanur Village), which is a category-1 legally designated Urban Area; hence, it is categorized as CRZ II. The Ajanur Grama Panchayat is the coastal grama panchayat in the state of Kerala, which is considered as 'other legally designated Urban Areas' as per CRZ Notification 2019. This category-1 panchayat (66 Grama

Panchayats) met the criteria of built-up area and developmental infrastructure to be considered for classification as falling under CRZ II area (Ref: 08/A2/2019/KCZMA dated 03,09.2022).

The proposed project activities, such as Northern Breakwater, Southern Breakwater, North Training Wall, Auction Hall, Internal Road, and Office Cum Surveillance Camera Room, fall within the CRZ IB (Intertidal Zone) and CRZ IVA (Lakshadweep Sea) categories. The proposed Parking Area falls within the CRZ IB (Intertidal Zone), CRZ II, and CRZ IVA (Lakshadweep Sea) categories. The proposed project activities such as Rainwater Harvesting, Canteen & Gearshed & Shop & Rest Room and Toilet fall in CRZ IB (Intertidal Zone) and CRZ IVB (Chithari River) categories. The proposed Approach Road and proposed Packing Container Storage Space fall in the CRZ IB (Intertidal Zone) & CRZ II categories. The proposed Boat Building and Repairing Yard, proposed ETP and Proposed Water Supply Arrangements fall within the CRZ IB category. The proposed Gate & Gate House falls in the CRZ II category, and the proposed Berthing Wharf, the proposed Wharf, and the proposed Reclamation Bund fall in the CRZ IVA (Lakshadweep Sea) category. The proposed Compound Wall falls in CRZ IA (Mangroves), CRZ IB (Intertidal Zone) and CRZ II categories. The existing FLC Buildings fall within the CRZ IB (Intertidal Zone) and CRZ II categories. The length (in meters) and area (in square meters) of the proposed project activities falling under the CRZ categories based on approved CZMP (as per CRZ Notification, 2019), and field surveys are given in Table 2 and Table 3, respectively.

Table 2. The length (m) of the proposed project activities under CRZ categories

Sl. No.	Proposed project Activities (as given by the project proponent)	Project activities under CRZ categories (length in meters)				
		CRZ IA (Mangroves*)	CRZ IB (Intertidal Zone)	CRZ II	CRZ IVA (Lakshadweep Sea)	CRZ IVB (Chithari River)
1	Proposed Compound Wall	16.48	187.68	719.08	-	-
2	Proposed Reclamation Bund	-	-	-	749.14	-

* Mangrove (CRZ IA) Observed during the Field visit

Table 3. The area (sqm) of the proposed project activities under CRZ categories

Sl. No.	Proposed project Activities (as given by the project proponent)	Project activities under CRZ categories (area in square meters)			
		CRZ IB (Intertidal Zone)	CRZ II	CRZ IVA (Lakshadweep Sea)	CRZ IVB (Chithari River)
1	Proposed Northern and Southern Breakwater	1345.67	-	32606.60	-
2	Proposed North Training Wall	1768.73	-	7660.61	-
3	Proposed Auction Hall	2536.18	-	755.80	-
4	Proposed Internal Road	29.91	-	1751.28	-
5	Proposed Office Cum Surveillance Camera Room	331.12	-	0.45	-
6	Proposed Parking Area	3127.00	47.75	765.03	-
7	Proposed Rainwater Harvesting	5.56	-	-	9.70
8	Proposed Canteen, Gearshed, Shop and Rest Room	17.30	-	-	79.53
9	Proposed Toilet	8.87	-	-	5.37
10	Proposed Approach Road	45.82	3315.28	-	-
11	Proposed Packing Container Storage Space	657.60	262.62	-	-
12	Proposed Boat Building and Repair Yard	791.16	-	-	-
13	Proposed ETP	259.03	-	-	-
14	Proposed Water Supply Arrangement	257.96	-	-	-
15	Proposed Gate and Gate House		11.32	-	-
16	Proposed Berthing Wharf	-	-	517.15	-
17	Proposed Wharf	-	-	854.41	-

Footprints of a few existing buildings in the vicinity of the project site is demarcated in the CRZ Map. The project layout with the proposed construction as provided by the project proponent is superimposed on the CRZ Map. The HTL/LTL and CRZ status of the project area have been provided in the CRZ map (Figure 2). The CRZ categories for the 7 km radius area around the project area are depicted in Figure 3.

14.0 Summary

- The CRZ Map and Status Report are prepared based on the field investigation and the CRZ Notification, 2019.

- The High Tide Line, Low Tide Line and Coastal Regulation Zone mapping for the proposed construction of the Fishing Harbour at Ajanur and its vicinity in Ajanur Village, within the Ajanur Grama Panchayat, Hosdurg Taluk, Kasaragod District, has been done on cadastral maps of 1:4000 scale.
- According to the approved CZMP (as per CRZ Notification 2019), part of the project site is located in Survey Numbers 176 and 187 in Ajanur Village, Ajanur Grama Panchayat, Hosdurg Taluk, Kasaragod District, Kerala. The majority of the proposed project site is situated on the Lakshadweep Sea and Poramboke land on the outskirts of Ajannur Village.
- As per the project layout and DPR provided by the project proponent, the proposed construction of Ajanur Fishing Harbour consists of a north breakwater of 1150 m in length, and south breakwater of 425 m length, a north training wall of 435 m in length, a wharf, auction hall, parking area, toilet, water supply arrangements, canteen/gearshed/shop/rest room, gate & gatehouse, internal road, boat building & repairing yard, reclamation bund, packing container storage space, office cum surveillance camera room, ETP, rainwater harvesting, compound wall, approach road, basin dredging, berthing wharf and dredging near training wall.
- The project site also includes the existing buildings of the fish landing centre, which comprises the net mending building, an auction hall, and a toilet block.
- As per the detailed project report provided by the project proponent, the total estimated cost of the project, including all components, is Rs. 20,000 lakhs.
- HTL, LTL and CRZ appearing in the approved CZMP of the project area have been incorporated in the CRZ Map.
- The HTL and LTL were demarcated by taking into consideration the geomorphic signatures that are discernible in the field.
- The seaward side of the High Tide Line at the project site is along the line of permanent vegetation, second monsoonal berms, the landward end of the concrete embankment, and the landward end of the seawall. The river side of the High Tide Line at the project site is along the line of permanent vegetation/earthen embankment.
- The northern part of the proposed project site is located on the Chithari River spit (sandbar), while the southern part of the site, along the seacoast, is protected by seawalls.

- Along the coastline, dense settlements are observed in the vicinity of the project area, especially the southern side of the project site, and a wide sandy beach is observed on the seaward side of the Fish Landing Centre Road.
- During the field survey, it was observed that the northern side of the project site features a 120 m wide sandbar formation, the middle section has a 25 m wide beach, and the southern side contains a 40 m wide beach.
- The proposed project area is directly accessible via the Ajanur Fish Landing Centre Coastal Road. Additionally, it can be reached through Crescent Road, which runs parallel to the seacoast and connects with Ajanur Fish Landing Centre Coastal Road
- The project area falls within the Coastal Regulation Zone of the Lakshadweep Sea and Chithari River and is part of Map No. KL - 78 (Sheet No. D 43 V 3/SW) of the CZMP of Kerala (approved in 2024) prepared as per the CRZ Notification, 2019.
- According to the approved CZMP (as per CRZ Notification, 2019) map, ecologically sensitive areas such as mangroves are not depicted in the project site or close vicinity. However, during the field survey, mangrove patches were observed within the project area and its vicinity along Chithari Riverbanks, which have been incorporated into the CRZ map.
- Other ecologically sensitive areas such as turtle nesting grounds, areas or structures of archaeological importance and heritage sites, etc., which are categorised as CRZ IA, are not found in the project area or in its close proximity.
- The intertidal area found along the seacoast and Chithari Riverbanks between the High Tide Line and Low Tide Line is CRZ IB (CRZ Notification 2019).
- The CRZ along the seacoast is 500 m landward of the HTL as per the CRZ Notification 2019.
- The water and bed area from the LTL up to the territorial water limit (12 Nautical miles) in the case of seacoast is CRZ IVA (CRZ Notification 2019).
- The water and the bed area between the LTLS on both banks of the river, located to the north and east of the project site, are CRZ IVB (CRZ Notification 2019).
- According to the approved Coastal Zone Management Plan (CZMP) of Kerala as per CRZ Notification 2019, part of the project area is located in Ajanur Grama Panchayat (Ajanur

Village), which is a category-1 legally designated Urban Area; hence, it is categorized as CRZ II.

- The proposed project activities fall within the CRZ IA (Mangroves), CRZ IB (Intertidal Zone), CRZ II, CRZ IVA (Lakshadweep Sea), and CRZ IVB (Chithari River) categories.
- The existing FLC Buildings fall within the CRZ IB (Intertidal Zone) and CRZ II categories.
- The Hazard Line as demarcated by MoEF&CC through Survey of India and provided in the approved CZMP of Kerala is superimposed in the CRZ Map (Figure 2).
- Footprints of a few existing buildings in the vicinity of the project area have been demarcated in the CRZ Map.
- Layout of the project area with the existing and proposed activities (as provided by the project proponent) is superimposed in the CRZ Map.
- The 7 km radius area CRZ Map around the project site has been prepared in 1:25,000 scale (Figure 3).

15.0 Conclusion

- According to the approved Coastal Zone Management Plan (CZMP) of Kerala as per CRZ Notification 2019, part of the project area is located in Ajanur Grama Panchayat (Ajanur Village), which is a category-1 legally designated Urban Area; hence, it is categorized as CRZ II. The majority of the proposed project site is situated on the Lakshadweep Sea and Poramboke land on the outskirts of Ajannur Village.
- The proposed project activities fall within the CRZ IA (Mangroves), CRZ IB (Intertidal Zone), CRZ II, CRZ IVA (Lakshadweep Sea), and CRZ IVB (Chithari River) categories. The existing FLC Buildings fall within the CRZ IB (Intertidal Zone) and CRZ II categories.
- According to the approved CZMP (as per CRZ Notification, 2019) map, ecologically sensitive areas such as mangroves are not depicted in the project site or close vicinity. However, during the field survey, mangrove patches were observed within the project area and its vicinity along Chithari Riverbanks, which have been incorporated into the CRZ map.
- As per CRZ Notification 2019, Paragraph 5.1.2, activities shall be regulated or permissible in CRZ IB areas as under Clause (i), ie. "land reclamation, bunding, etc. shall be permitted only for activities such as (Sub-clause (a)) foreshore facilities like ports, harbours, jetties,

wharves, quays, slipway, bridges, hover ports for coast guard, sea links, etc.," and Clause (ii) ie. "the activities related to waterfront or directly needing foreshore facilities such as ports and harbours, jetties, quays, wharves, erosion control measures, breakwaters, pipelines, lighthouses, navigational safety facilities, coastal police stations, Indian coast guard stations and the like".

- As per CRZ Notification 2019, Paragraph 5.2, Clause (i), the activities permitted in CRZ IB shall also be permissible in CRZ-II, as applicable.
- As per CRZ Notification 2019, Paragraph 5.4, activities shall be permitted and regulated in CRZ IV areas as under Clause (ii), ie. "land reclamation, bunding, etc. to be permitted only for activities such as (Sub-clause (a)) foreshore facilities like ports, harbours, jetties, wharves, quays, slipways, bridges, sea links and hover pots for the coast guard, etc., and Clause (iii) ie. "activities related to waterfront or directly needing foreshore facilities, such as ports and harbours, jetties, quays, wharves, erosion control measures, breakwaters, pipelines, navigational safety facilities and the like".

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PLATES

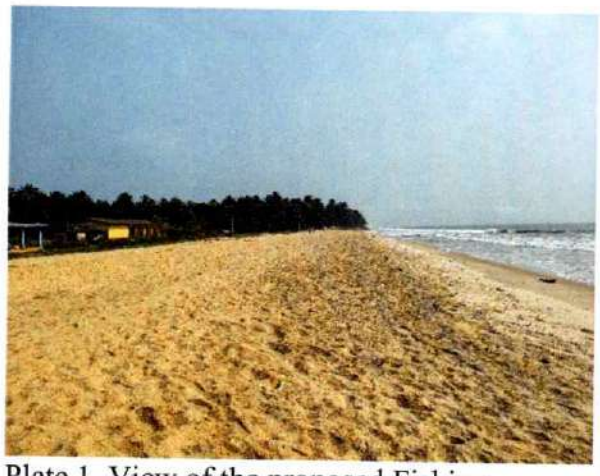


Plate 1. View of the proposed Fishing Harbour site at Ajanur.



Plate 2. Sandbar formation along Chithari River mouth.

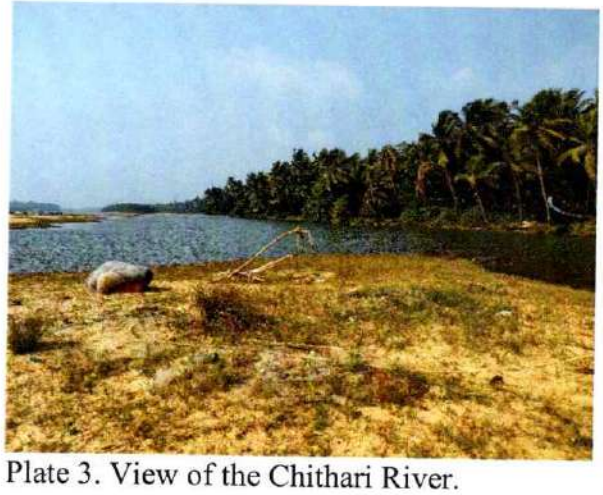


Plate 3. View of the Chithari River.



Plate 4. Mangrove patches along the banks of Chithari River.



Plate 5. Fishing boats parked along the banks of Chithari River mouth.

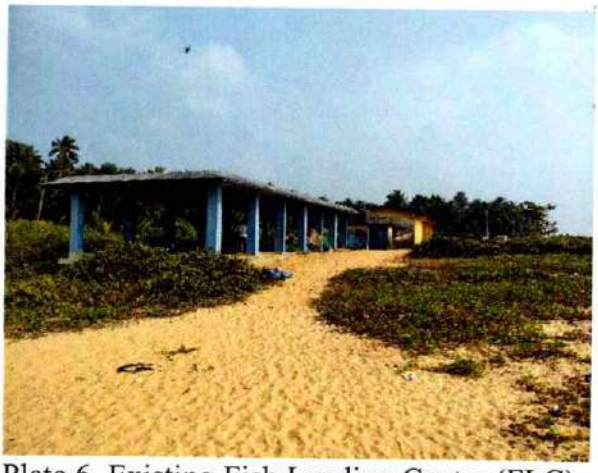


Plate 6. Existing Fish Landing Centre (FLC) buildings.

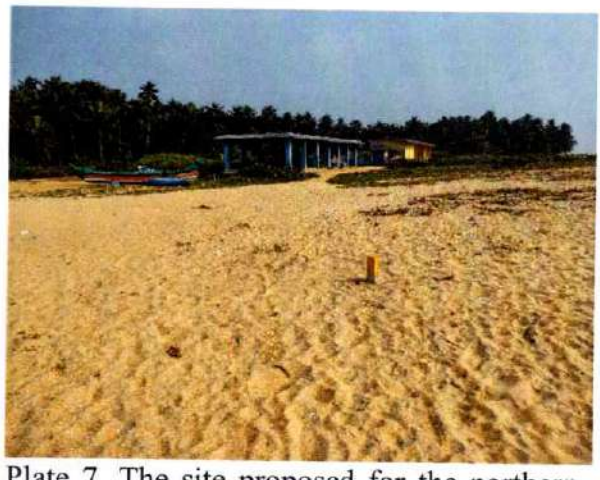


Plate 7. The site proposed for the northern Breakwater.

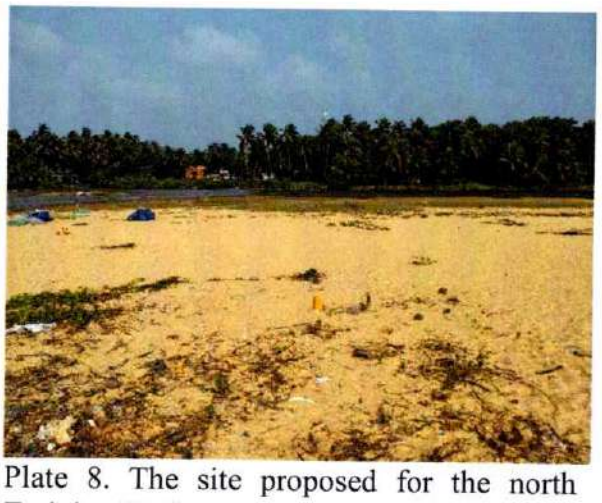


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Plate 9. Permanent vegetation/second berm as High Tide Line at some part of the project site.



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Plate 12. The concrete embankment protecting the FLC road in certain areas - A view from the northern side of the project site.



Plate 13. The seawall protecting the coastline; High Tide Line marks the landward end of the seawall at some stretches of the project site.



Plate 14. The site proposed for the southern Breakwater.

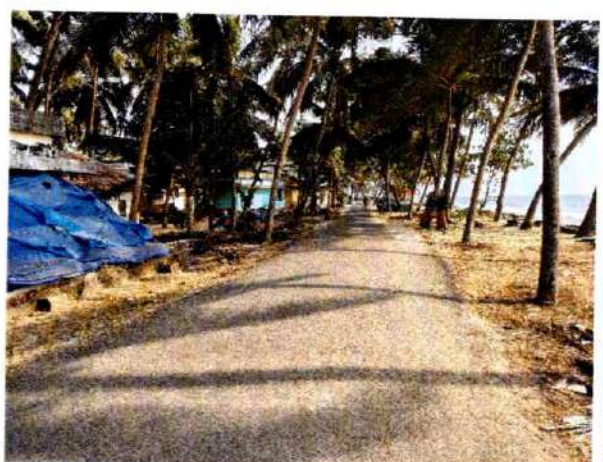


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WAVE PROPAGATION STUDIES TO DETERMINE WAVE CLIMATE FOR THE DEVELOPMENT OF FISH LANDING FACILITIES AT AJANUR, DISTRICT KASARAGOD, KERALA

Technical Report No. **October 2016**

1. INTRODUCTION

Harbour Engineering Department, Government of Kerala has a proposal to develop a fishing harbour at Ajanur. Ajanur village is situated about 15 km south of Kasaragod district at Latitude 12.33^0 and longitude 75.18^0 on the west coast of India in Kerala state Figure 1. Wave tranquility studies to assess wave disturbance in the harbour and the study of littoral movement and shoreline changes, were referred to CW&PRS. The report of the wave tranquility studies is presented.

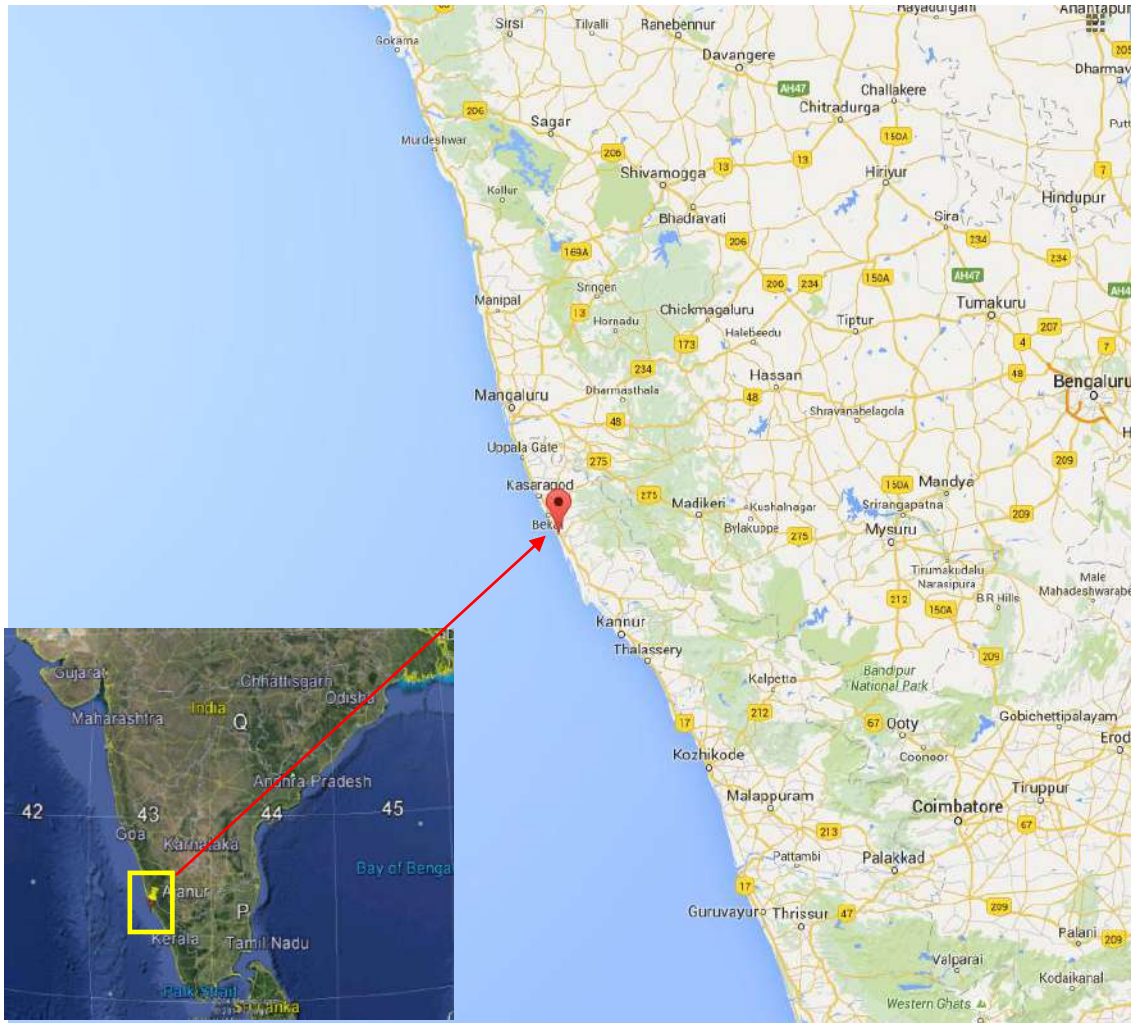


Figure 1 index map of Ajanur, Kasargod, Kerala

2. SCOPE OF STUDIES

Mathematical model studies for wave tranquility were carried out in two stages:

1. Transformation of wave height and wave direction from deep water to 10 m depth using spectral wave model MIKE 21- SW.
2. Simulation of wave propagation in the harbor to obtain wave height distribution in the harbor using MIKE-21 BW model.

This report pertains to mathematical model studies for wave tranquility for optimizing the harbour layout and to determine the near shore wave climate in the vicinity of AJANUR village.

3. WAVE DATA IN DEEP SEA

Near shore wave data is required for simulation of wave heights in the harbour/port. Instrumentally recorded wave data at the site over a period of several years, if available, is best suited for this purpose. However, if such data is not available, the near shore wave climate can be obtained by transforming the offshore wave data to the near shoe locations using the mathematical modeling technique. Visually observed offshore wave data as reported by India Meteorological Department (IMD) observed from ships plying in deep waters off AJANUR (Latitude 10^0 N to 15^0 N, Longitude 70^0 E to 75^0 E) for a period of 33 years i.e. 1968 to 2000 were analyzed. The frequency distribution of wave heights from different directions averaged during different seasons and entire year for the above offshore data is given in Table 1 to Table 4. Corresponding wave rose diagrams are presented in Figure 2, Figure 3, Figure 4 & Figure 5. It has already been established that the wave height based on ship observed data closely corresponds to significant wave height, which represents average energy of the random wave train.

The Table 1 shows frequency of occurrence of wave for South West monsoon from all the directions. The predominant wave directions in this season are from the WNW to SW quadrant. The Table 2 shows the frequency of occurrence of waves for North East Monsoon from all the directions. It is seen that waves with similar frequency occur from almost all direction. The Table 3 shows frequency of occurrence of wave for Non monsoon season from all the directions. It is seen that waves with similar frequency occur from almost all direction. The Table 4 shows frequency of occurrence of wave for the Entire Year Period from all the directions. The predominant wave directions are from the SW to North quadrant. Maximum waves of 4.5m only have been considered in these visually observed wave data sets.

Table 1 Percentage occurrence of Wave height & direction off Ajanur for South-West monsoon (June-Sept)

Wave Ht (m) / Direction	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	Total
									Calm%	0.59
22.5	0.09	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.27
45.0	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.12
67.5	0.00	0.00	0.12	0.00	0.13	0.00	0.00	0.00	0.00	0.25
90.0	0.00	0.09	0.07	0.00	0.08	0.07	0.00	0.00	0.00	0.31
112.5	0.00	0.00	0.17	0.15	0.00	0.12	0.00	0.00	0.00	0.44
135.0	0.14	0.11	0.18	0.37	0.29	0.34	0.00	0.23	0.00	1.66
157.5	0.20	0.25	0.42	0.05	0.19	0.21	0.00	0.23	0.03	1.58
180.0	0.06	0.27	0.40	0.66	0.13	0.15	0.06	0.41	0.18	2.32
202.5	0.30	0.15	0.51	0.34	0.24	0.20	0.21	0.23	0.00	2.18
225.0	0.51	1.08	1.49	1.59	1.11	0.93	0.71	0.33	0.21	7.96
247.5	0.58	2.02	2.09	3.72	1.63	1.72	0.82	1.17	0.71	14.46
270.0	1.43	5.03	4.48	5.58	4.80	6.08	3.15	4.19	2.91	37.65
292.5	0.84	2.47	3.89	4.11	3.01	2.94	1.15	1.27	1.65	21.33
315.0	0.14	0.88	1.16	2.09	1.07	0.72	0.04	0.21	0.48	6.79
337.5	0.18	0.60	0.33	0.36	0.08	0.08	0.00	0.00	0.00	1.63
360.0	0.30	0.07	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.46
Total	4.77	13.02	15.61	19.11	12.76	13.56	6.14	8.27	6.17	100.00

Table 2 Percentage occurrence of Wave height & direction off Ajanur for North-East monsoon period (Oct-Jan)

Wave Ht (m) / Direction	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	Total
									Calm%	0.86
22.5	1.95	2.41	0.95	1.06	0.28	0.16	0.00	0.10	0.00	6.91
45.0	2.22	2.60	1.90	1.81	0.04	0.24	0.00	0.10	0.11	9.02
67.5	1.88	2.71	1.94	0.75	0.33	0.22	0.14	0.00	0.00	7.97
90.0	2.69	3.23	1.71	0.84	0.19	0.43	0.07	0.00	0.00	9.16
112.5	1.55	2.00	0.98	0.80	0.08	0.35	0.10	0.00	0.00	5.86
135.0	0.56	1.45	0.61	0.48	0.03	0.44	0.10	0.00	0.00	3.67
157.5	0.54	0.78	0.99	0.51	0.09	0.22	0.10	0.03	0.00	3.26
180.0	1.19	1.70	1.17	0.97	0.38	0.07	0.00	0.17	0.00	5.65
202.5	0.97	0.50	1.03	0.92	0.25	0.21	0.08	0.00	0.00	3.96
225.0	0.52	1.17	0.77	0.65	0.46	0.04	0.13	0.00	0.10	3.84
247.5	0.92	1.82	1.57	0.83	0.69	0.75	0.10	0.00	0.00	6.68
270.0	0.65	1.82	1.31	1.50	0.17	0.41	0.00	0.00	0.00	5.86
292.5	1.23	1.48	1.63	0.67	0.13	0.19	0.00	0.10	0.00	5.43
315.0	1.15	2.04	0.99	0.47	0.34	0.00	0.00	0.00	0.00	4.99
337.5	1.96	2.77	1.61	0.80	0.11	0.10	0.00	0.00	0.00	7.35
360.0	2.51	3.58	1.73	1.37	0.12	0.22	0.00	0.00	0.00	9.53
Total	22.49	32.06	20.89	14.43	3.69	4.05	0.82	0.50	0.21	100.00

Table 3 Percentage occurrence of Wave height & direction off Ajanur for non-monsoon period (Feb-May)

Wave Ht(m) Direction	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	Total
									Calm%	1.27
22.5	2.30	2.82	1.12	1.01	0.36	0.1	0.16	0.12	0.05	8.04
45.0	2.10	1.40	0.89	0.38	0.13	0.17	0.37	0.37	0.00	5.81
67.5	0.62	1.34	0.22	0.04	0.00	0.22	0.00	0.15	0.00	2.59
90.0	0.87	1.48	0.47	0.60	0.00	0.00	0.00	0.28	0.00	3.70
112.5	0.84	1.33	0.60	0.40	0.00	0.00	0.00	0.05	0.00	3.22
135.0	1.13	1.90	0.86	0.26	0.01	0.00	0.00	0.25	0.00	4.41
157.5	1.56	1.03	1.62	0.62	0.25	0.11	0.04	0.04	0.00	5.27
180.0	1.04	1.98	0.88	0.76	0.07	0.07	0.17	0.10	0.00	5.07
202.5	0.52	0.55	0.96	0.95	0.05	0.16	0.05	0.00	0.00	3.24
225.0	0.96	1.09	0.40	0.61	0.34	0.15	0.26	0.12	0.12	4.05
247.5	0.72	1.02	1.13	1.24	0.23	0.11	0.00	0.10	0.03	4.58
270.0	1.26	2.10	0.81	1.19	0.07	0.48	0.00	0.11	0.08	6.10
292.5	1.68	2.07	1.24	0.40	0.33	0.27	0.00	0.00	0.00	5.99
315.0	3.45	3.18	1.57	0.85	0.45	0.16	0.00	0.00	0.00	9.66
337.5	3.57	4.88	2.78	1.02	0.04	0.15	0.00	0.19	0.11	12.74
360.0	4.78	4.99	2.28	1.10	0.31	0.12	0.30	0.20	0.18	14.26
Total	27.54	33.16	17.83	11.43	2.64	2.27	1.35	2.08	0.57	100.01

Table 4. Percentage occurrence of wave height & direction off Ajanur for entire period (Jan-Dec)

Wave Ht(m) Direction	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	Total
									Calm%	0.89
22.5	1.45	1.74	0.75	0.69	0.21	0.09	0.05	0.07	0.02	5.07
45.0	1.44	1.33	0.97	0.73	0.06	0.14	0.12	0.16	0.04	4.98
67.5	0.83	1.35	0.76	0.26	0.15	0.15	0.05	0.05	0.00	3.60
90.0	1.19	1.60	0.75	0.48	0.09	0.17	0.02	0.09	0.00	4.39
112.5	0.80	1.11	0.58	0.45	0.03	0.16	0.03	0.02	0.00	3.17
135.0	0.61	1.15	0.55	0.37	0.11	0.26	0.03	0.16	0.00	3.25
157.5	0.77	0.69	1.01	0.39	0.18	0.18	0.05	0.10	0.01	3.38
180.0	0.76	1.32	0.82	0.80	0.19	0.10	0.08	0.23	0.06	4.34
202.5	0.60	0.40	0.83	0.74	0.18	0.19	0.11	0.08	0.00	3.13
225.0	0.66	1.11	0.89	0.95	0.64	0.37	0.37	0.15	0.14	5.28
247.5	0.74	1.62	1.60	1.93	0.85	0.86	0.31	0.42	0.25	8.57
270.0	1.13	2.98	2.20	2.76	1.68	2.32	1.05	1.43	1.00	16.55
292.5	1.24	2.01	2.25	1.73	1.16	1.13	0.38	0.46	0.55	10.91
315.0	1.58	2.03	1.24	1.14	0.62	0.29	0.01	0.07	0.16	7.15
337.5	1.90	2.75	1.57	0.73	0.08	0.11	0.00	0.06	0.04	7.24
360.0	2.53	2.88	1.34	0.85	0.14	0.11	0.10	0.07	0.06	8.08
Total	18.25	26.08	18.11	14.99	6.36	6.63	2.77	3.62	2.32	99.97

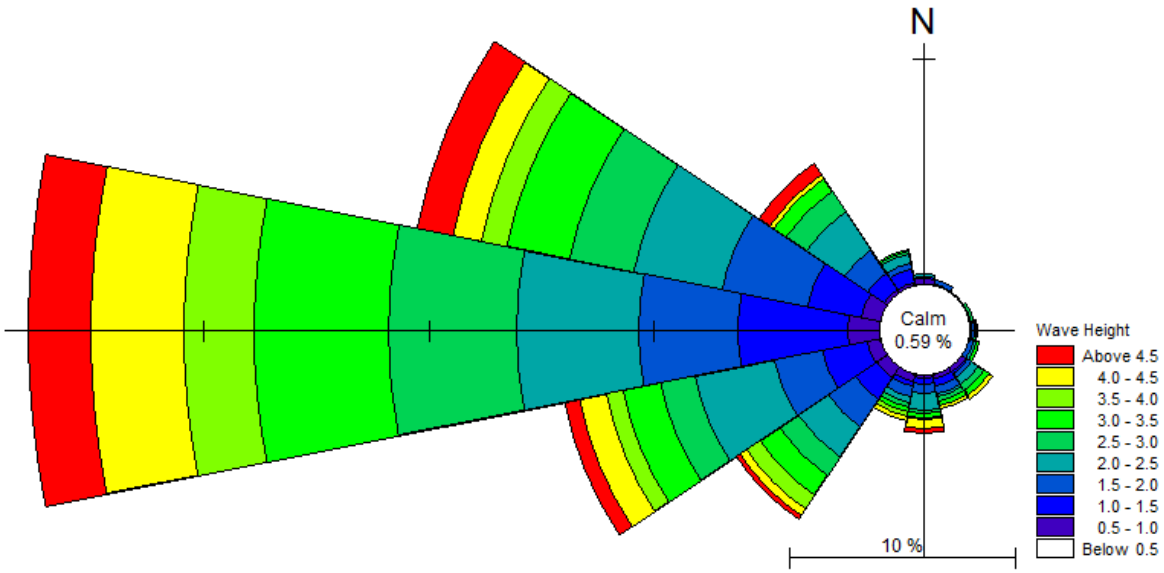


Figure 2. Offshore Wave Rose Diagram for South-West Monsoon

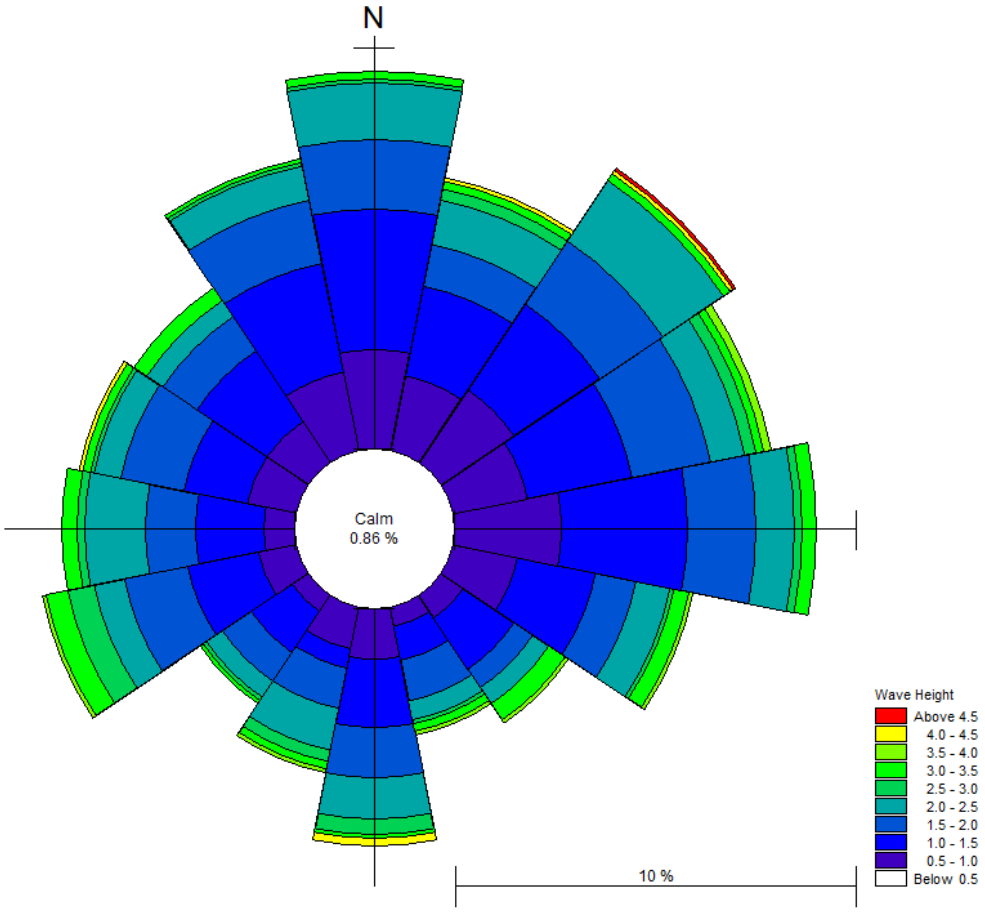


Figure 3. Offshore Wave Rose Diagram for North-East Monsoon

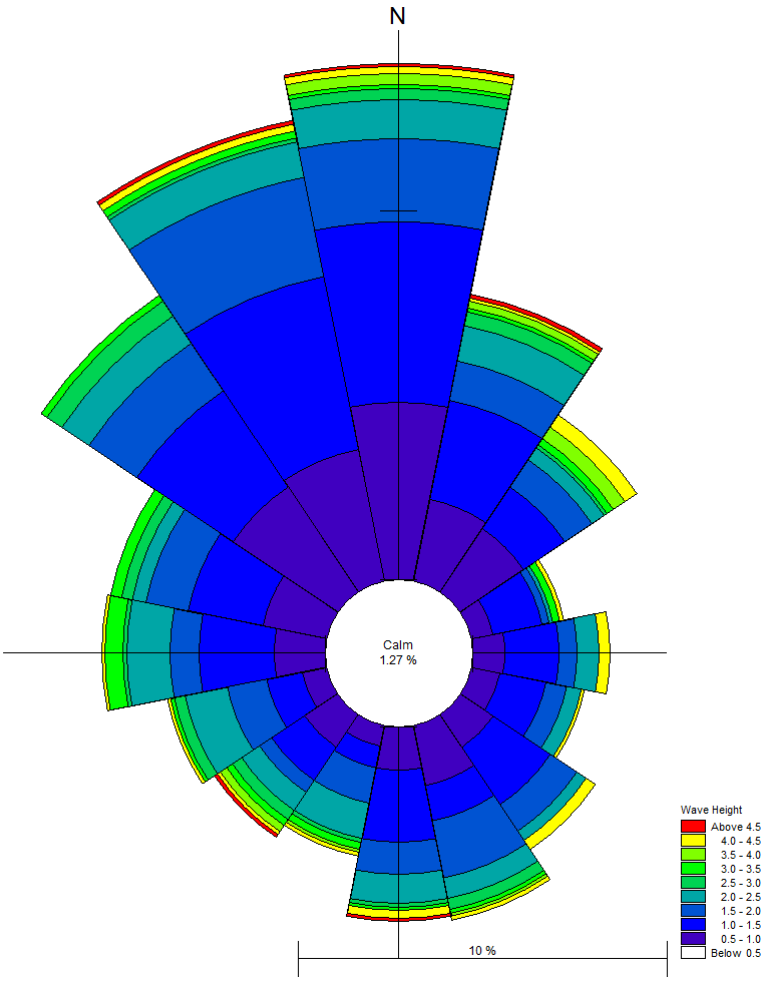


Figure 4. Offshore Wave Rose Diagram for Non Monsoon

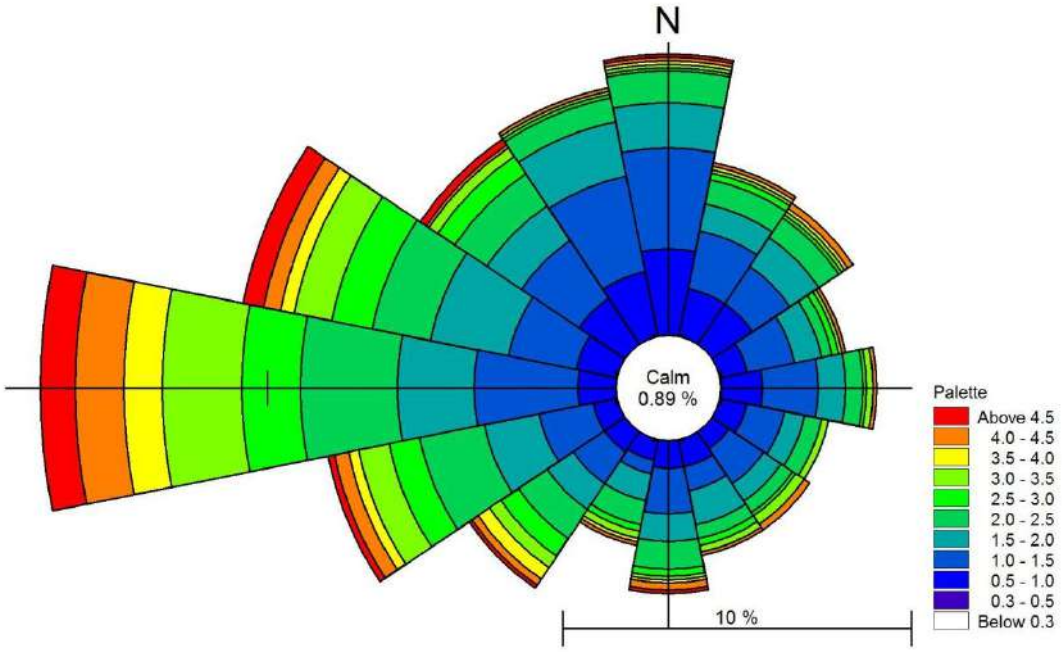


Figure 5. Offshore Wave Rose Diagram for Entire Year

3.1 Tidal Data

The proposed site of development is in the south of Kasaragod. Important tidal levels at KASARAGOD with respect to Chart Datum (As per admiralty chart No. 217 and 2029) are reported to be as under:

MHHW	:	1.4 m
MLHW	:	1.3 m
MSL	:	1.0 m
MHLW	:	0.9 m
MLLW	:	0.4 m

This indicates that the maximum tidal range in the study area is of the order of 1.0 m. Tidal currents are generally parallel to the coastline and directed northward during flood as well as ebb tide with the maximum magnitude of the order of 0.4 m/s (Littoral drift studies report).

4. MATHEMATICAL MODEL STUDIES

Mathematical model studies for examining the wave conditions in the proposed fishery harbour were carried out in two stages:

(i) Transformation of wave height and wave direction while propagating from deep waters to shallow coastal waters (using MIKE 21 SW software)

(ii) Simulation of wave height in the proposed area of development (using software MIKE 21 BW)

4.1 Wave Transformation from deep sea to nearshore region

As waves travel from deep sea to shallow coastal waters, they undergo changes in direction and height due to the processes of refraction and shoaling. The simulation of wave transformation from deep to shallow waters was carried out using MIKE – 21 SW model. This model is a spectral wind wave model based on unstructured mesh, which takes into account all the important phenomena like wave growth by influence of wind, non linear wave-wave interaction, dissipation due to white capping, bottom friction and depth induced breaking. It can also model diffraction effects due to the presence of large structures like breakwaters, groins etc. The effect of refraction and shoaling of waves due to depth variations and wave current interaction are also considered in the model. The output of the model are the regular wave parameters which include the significant wave height, mean wave period, mean wave direction, directional standard deviation and wave radiation stress. The model simulates the growth, decay and transformation of wind – generated waves and swell in offshore and coastal areas.

The governing equation is the wave action balance equation. In horizontal Cartesian co-ordinates the conservation equation for wave action is

$$\frac{\partial N}{\partial t} + \nabla.(\vec{\nu} N) = \frac{S}{\sigma}$$

where N($\vec{x}$, σ, θ,t) is the action density, t is the time, $\vec{x}$ = (x,y) is the Cartesian co-ordinates, $\vec{\nu}$ = (C_x , C_y , C_σ , C_θ) is the propagation velocity of a wave group in the four dimensional phase space $\vec{x}$, σ and θ. S is the source term for the energy balance equation. ∇ is the four dimensional differential operator in the $\vec{x}$, σ and θ space. The equation is solved using cell–centered finite volume method.

5. THE MODEL STUDIES

An area of about 115 km by 85 km (Figure 6) with an unstructured mesh was considered for studies with MIKE –21 SW model which extends beyond 100m in deep sea. The model was run for the offshore wave directions given in Table 4 for all the incident wave directions and heights.

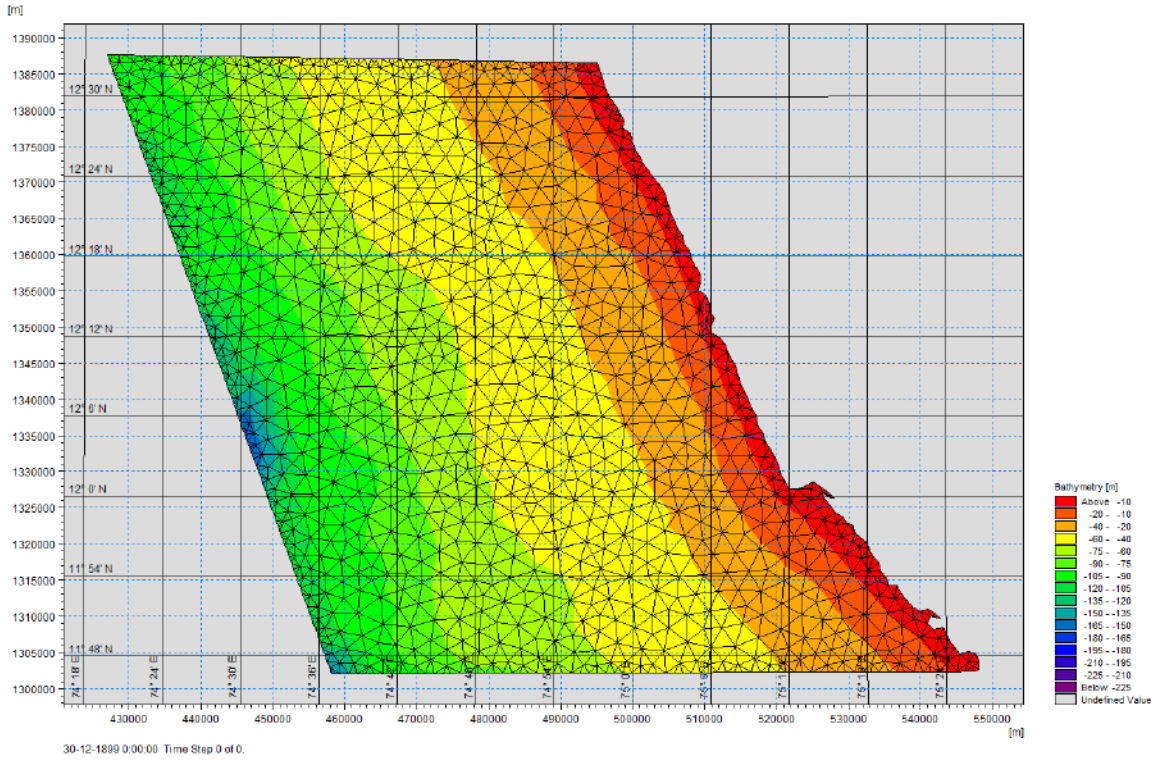


Figure 6. Bathymetry for wave transformation studies

The frequency distribution of wave heights from different directions at the inshore location is given in Table 5 to Table 8. Corresponding wave rose diagrams are presented in Figure 7 to Figure 10.

Table 5. Percentage occurrence of Wave height & direction at Ajanur for South-West monsoon (June-Sept)

Wave Height (m)	0.30	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	*TOTAL*
Direction										Calm %	3.03
22.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
112.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
135	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
157.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180	0.39	0.98	0.20	0.20	0.00	0.00	0.00	0.00	0.00	0.00	1.76
202.5	0.59	1.08	2.74	1.08	0.20	0.00	0.00	0.00	0.00	0.00	5.67
225	0.49	1.17	2.93	2.54	0.68	0.20	0.00	0.00	0.00	0.00	8.01
247.5	0.49	2.15	4.20	2.74	2.05	2.64	0.00	0.00	0.00	0.00	14.27
270	2.15	5.18	11.53	12.12	12.61	5.87	1.37	0.00	0.00	0.00	50.83
292.5	0.68	6.55	5.08	3.71	0.39	0.00	0.00	0.00	0.00	0.00	16.42
315	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
337.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	4.79	17.11	26.69	22.39	15.93	8.70	1.37	0.00	0.00	0.00	100.0

Table 6. Percentage occurrence of Wave height & direction at for North-East monsoon period (Oct-Jan)

Wave Height (m)	0.30	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	*TOTAL*
Direction										Calm %	51.71
22.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
112.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
135	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
157.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180	1.05	1.90	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.14
202.5	2.67	3.04	3.71	1.24	0.57	0.10	0.00	0.00	0.00	0.00	11.32
225	0.95	1.24	0.86	0.48	0.10	0.10	0.00	0.00	0.00	0.00	3.71
247.5	1.14	2.19	1.62	0.76	0.67	0.67	0.00	0.00	0.00	0.00	7.03
270	1.43	3.33	3.04	1.33	0.57	0.00	0.00	0.00	0.00	0.00	9.69
292.5	5.51	5.89	1.52	0.38	0.10	0.00	0.00	0.00	0.00	0.00	13.40
315	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
337.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	12.75	17.59	10.93	4.18	2.00	0.86	0.00	0.00	0.00	0.00	100.00

Table 7. Percentage occurrence of Wave height & direction at Ajanur for non-monsoon period (Feb-May)

Wave Height (m) Direction	0.30	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	*TOTAL*
										Calm %	41.23
22.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
112.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
135	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
157.5	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
180	3.34	2.55	1.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.06
202.5	1.76	2.84	2.55	1.37	0.00	0.10	0.00	0.00	0.00	0.00	8.62
225	1.08	1.08	0.39	0.59	0.69	0.49	0.00	0.00	0.00	0.00	4.31
247.5	0.69	0.98	1.08	1.18	0.49	0.00	0.00	0.00	0.00	0.00	4.41
270	2.15	4.11	3.33	0.78	0.29	0.00	0.00	0.00	0.00	0.00	10.68
292.5	9.21	9.99	0.49	0.88	0.00	0.00	0.00	0.00	0.00	0.00	20.57
315	2.74	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.04
337.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	21.06	21.84	9.01	4.80	1.47	0.59	0.00	0.00	0.00	0.00	100.00

Table 8. Percentage occurrence of Wave height & direction at Ajanur for entire period (Jan-Dec)

Wave Height (m) Direction	0.3	0.5	1	1.5	2	2.5	3	3.5	4	4.5	*TOTAL*
										Calm %	32.07
22.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
112.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
135	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
157.5	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
180	1.59	1.81	0.52	0.07	0.00	0.00	0.00	0.00	0.00	0.00	3.99
202.5	1.67	2.32	3.00	1.23	0.26	0.07	0.00	0.00	0.00	0.00	8.55
225	0.84	1.16	1.39	1.20	0.49	0.26	0.00	0.00	0.00	0.00	5.35
247.5	0.75	1.77	2.30	1.56	1.07	1.10	0.00	0.00	0.00	0.00	8.56
270	1.90	4.21	5.97	4.74	4.49	1.96	0.46	0.00	0.00	0.00	23.72
292.5	5.12	7.48	2.36	1.66	0.16	0.00	0.00	0.00	0.00	0.00	16.78
315	0.91	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.01
337.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	12.82	18.85	15.55	10.46	6.47	3.39	0.46	0.00	0.00	0.00	100.00

Table 8 and Figure 10 show the percentage occurrence of wave distribution at 10 m water depth near Ajanur for the entire year. From the above table it can be interpreted that the predominant wave directions are SSW, SW, WSW and West with the percentage occurrence of 8.55, 5.35, 8.56 and 23.72 respectively. The maximum wave height of 3.0 m is observed from West direction. Table 5 shows the percentage occurrence of wave distribution at 10 m depth near Ajanur for South-West Monsoon season. From the above table, it can be interpreted that the predominant wave directions are SW, WSW, West and WNW with the percentage occurrence of 8.02, 14.27, 50.83, and 16.42 respectively. The maximum wave height of 3.5 m is observed from West direction. Table 6 shows the percentage occurrence of wave distribution at 10 m depth near Ajanur for the North-East Monsoon season. From the above table it can be interpreted that the predominant wave directions are SSW, SW, WSW, West and WNW with the percentage occurrence of 11.32, 3.71, 7.03, 9.7 and 13.4 respectively. The maximum wave height of 2.5 m is observed from West-South-West direction. Table 7 shows the percentage occurrence of wave distribution at 10 m depth near Ajanur for the Non-Monsoon season. From the above table, it can be interpreted that the predominant wave directions are SSW, SW, WSW and West with the percentage occurrence of 8.62, 4.31, 4.41 and 10.68 respectively. The maximum wave height of 2.5 m is observed from South-West direction.

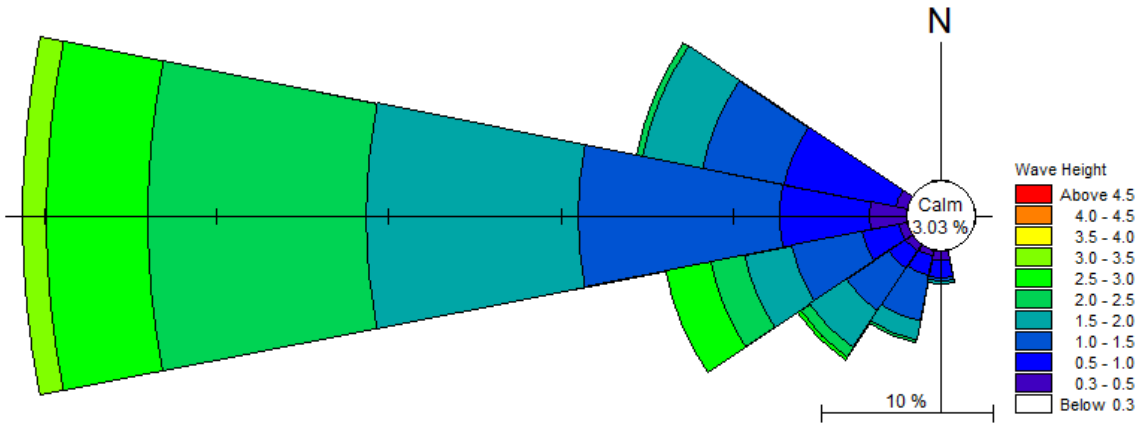


Figure 7. Wave Rose Diagram near Ajanur for South West Monsoon (Jun. – Sept.)

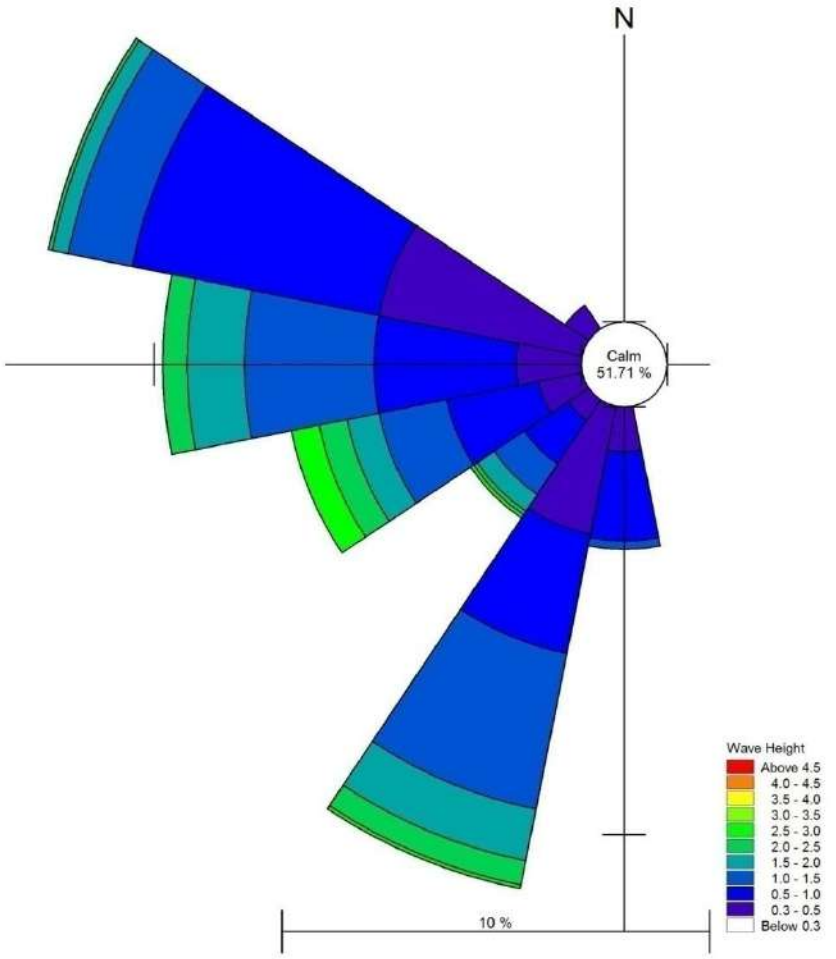


Figure 8. Wave Rose Diagram near Ajanur for North East Monsoon (Oct. – Jan.)

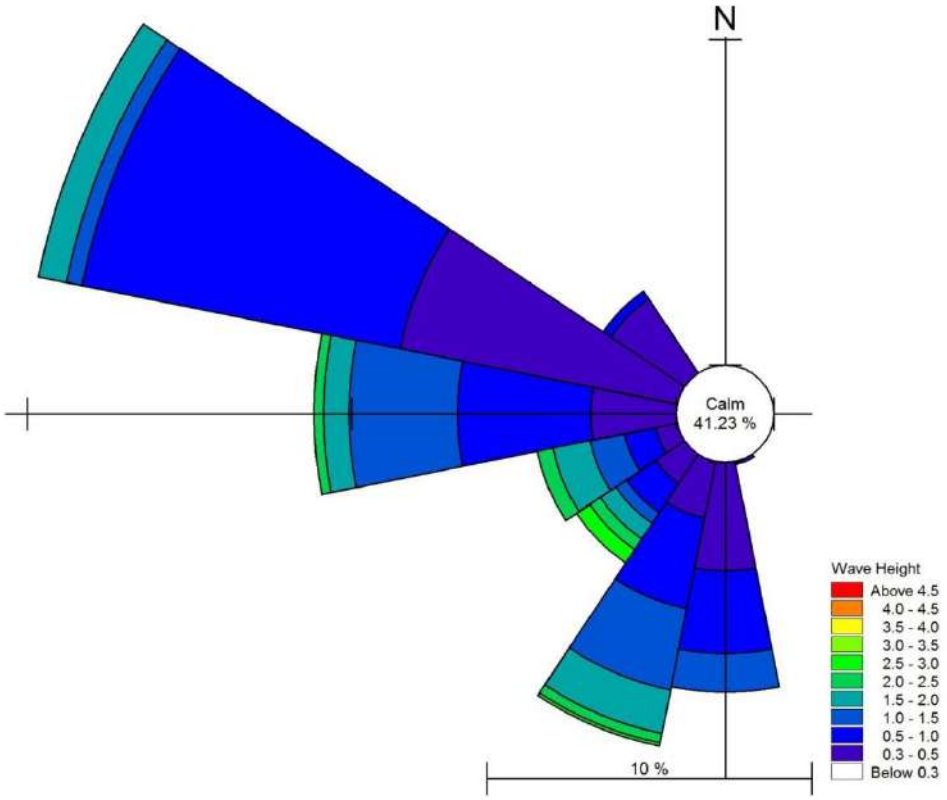


Figure 9. Wave Rose Diagram near Ajanur for Non Monsoon (Feb. – May.)

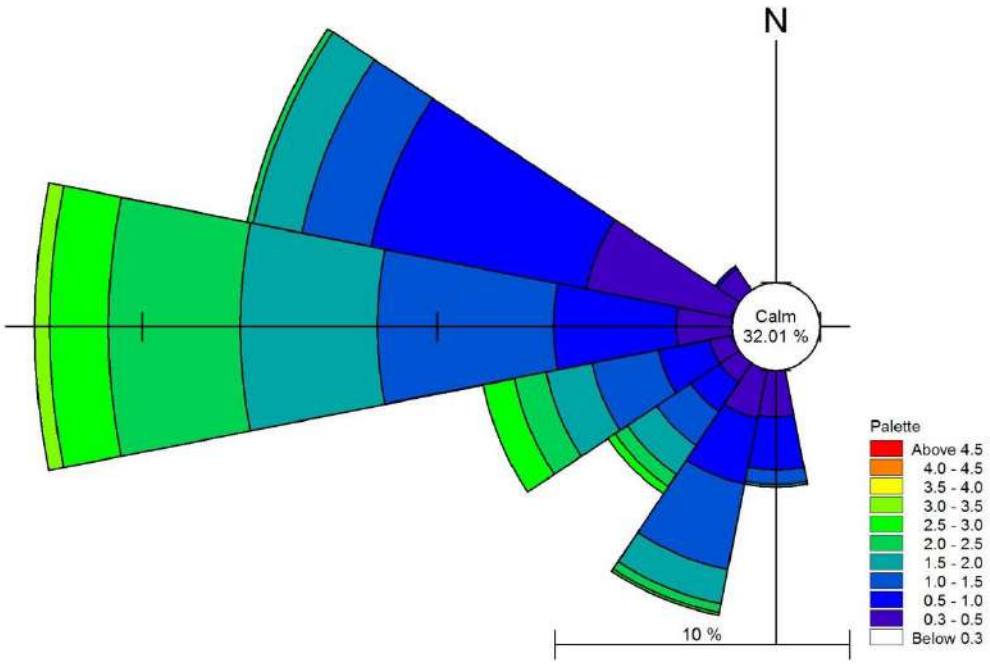


Figure 10. Wave Rose Diagram near Ajanur for Entire Year (Jan – Dec.)

Hence the wave conditions as input to the wave tranquility studies with MIKE 21 BW model have been shortlisted based on the percentage of occurrence are tabulated below in Table 9.

Table 9. Input Wave Conditions for Wave Tranquility Studies.

Incident Wave Direction	Incident Wave Height
SSW	1.5
SW	2.0
WSW	2.5
WEST	2.5
WNW	1.5

6. PERMISSIBLE WAVE HEIGHTS

The permissible wave disturbance at the berthing place depends on the ship size, mooring & berthing system, method of loading & unloading used at berth and on orientation of the berth with respect to wave direction etc. The acceptable wave heights for different types of vessels recommended by the International Association of Ports and Harbours are given in Table 10.

Table 10. Allowable wave heights near the berths (IPA Norms)

Type of vessels	Acceptable wave heights - H_s(m)	
	Incident angle 0^0 (head on)	Incident angle (45^0 – 90^0)
Conventional general cargo vessels	1.0	0.8
Container vessels	0.5	0.4
Dry bulk carrier 30-100,000 DWT(loading)	1.5	1.0
Dry bulk carrier 30-100,000 DWT(unloading)	1.0	0.8 – 1.0
Tankers 30-200,000 DWT	1.5 - 2.5	1.0 – 1.2

As per IS 4651 (Part V), the wave disturbance within the harbour should not exceed the tranquility conditions given in following Table 11.

Table 11. Allowable wave heights near the berths (IS-4651)

Type of vessels	Approximate acceptable wave heights - H_s(m)	
	At berth	Turning circle
General cargo	0.65	0.90
Bulk cargo	0.90	1.20
Container cargo	0.65	1.20
Dredgers	-	0.45 – 2.0

The wave tranquility studies were carried out assuming a wave tranquility limit of 0.3 m as the tranquility limit for the fishing boats / vessels have not been given in the above table.

7. WAVE TRANQUILITY STUDIES

Mathematical model studies to assess wave tranquility in the harbour basin were carried out using the model MIKE 21 BW. The mean sea levels at Mangalore 1.0m, KASARAGOD 0.89 m, Cannanore 1.02 m have been obtained from admiralty charts. Therefore the tidal level of 0.89 m at KASARAGOD has been considered for the wave tranquility studies using MIKE 21 BW. The model was simulated for all the input wave conditions derived from the wave transformation studies for each harbour Layout suggested.

Initially, the harbour authorities have suggested three different layouts for the studies. MIKE 21 BW model was used to study the wave distribution in the harbour area with all the three Layouts (Layout-1, Layout-2 and Layout-3). During the month of August 2016, Site Visit to the proposed fisheries harbour was made. Based on the discussion at site, project authorities suggested a different layout, which is similar to layout 3. However in the proposed layout (Layout 4), alignment of the northern breakwater is slightly different. This layout was also studied using MIKE 21 BW and results are also discussed in this report.

7.1 Layout 1

Based on the coordinates provided by the project authorities the north breakwater is having a length of 458m. The southern breakwater consists of shore normal breakwater of length 291 m which is extended along shore breakwater of length 395 m. The breakwaters extend up to 4 m to 4.4 m depth (Figure 11). Depths inside the harbour have been considered as -3.0 m. Total length of the southern breakwater works out to be 686 m.

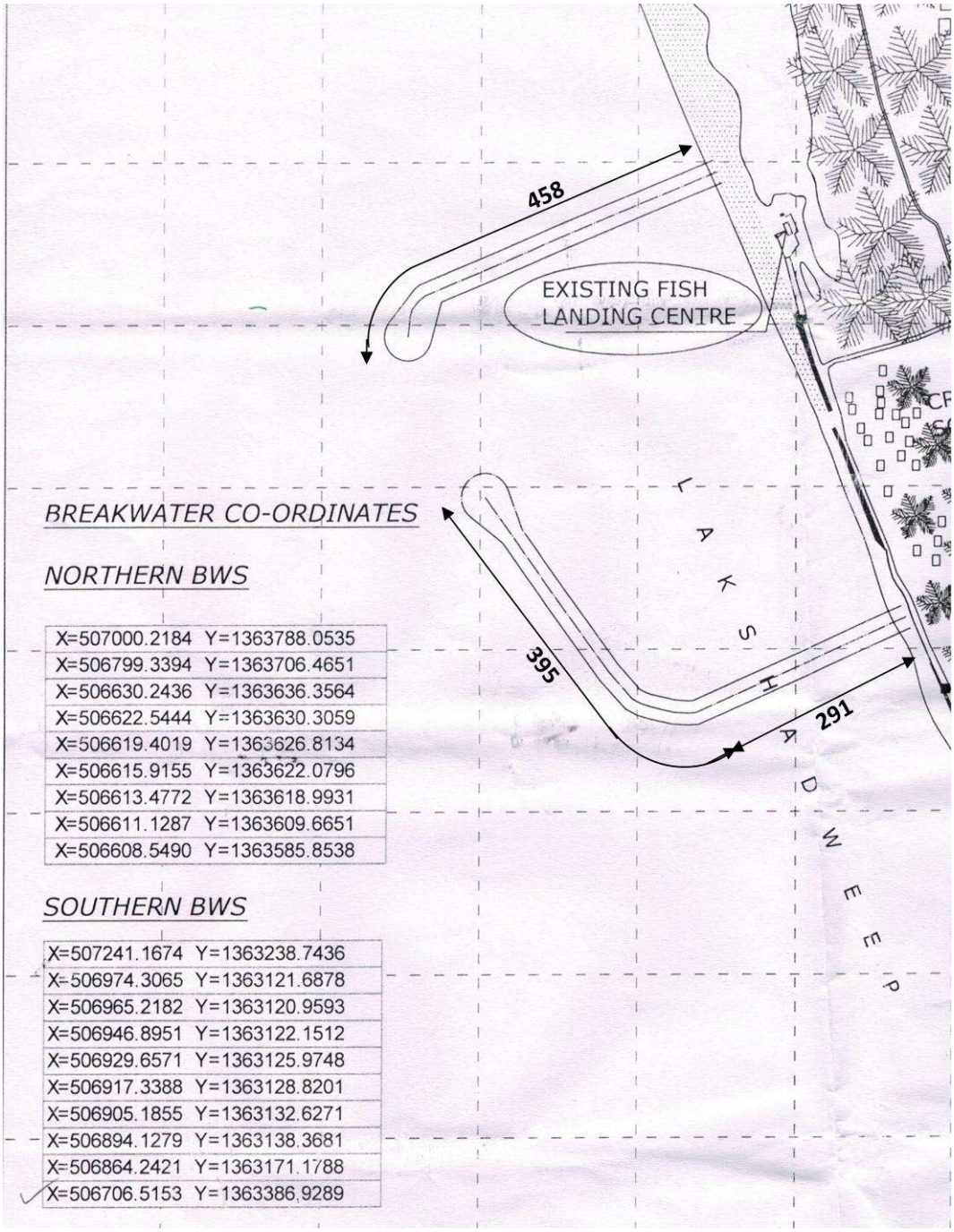


Figure 11. Proposed Layout 1

7.2 Layout 2

Based on the coordinates provided by the project authorities the southern breakwater is having a length of 458m. The northern breakwater consists of shore normal breakwater of length 291 m which is extended along the shore for an additional length of 395 m, making the total length of northern breakwater as 686 m. The breakwaters extend up to 4 m to 4.4 m depth (Figure 12).

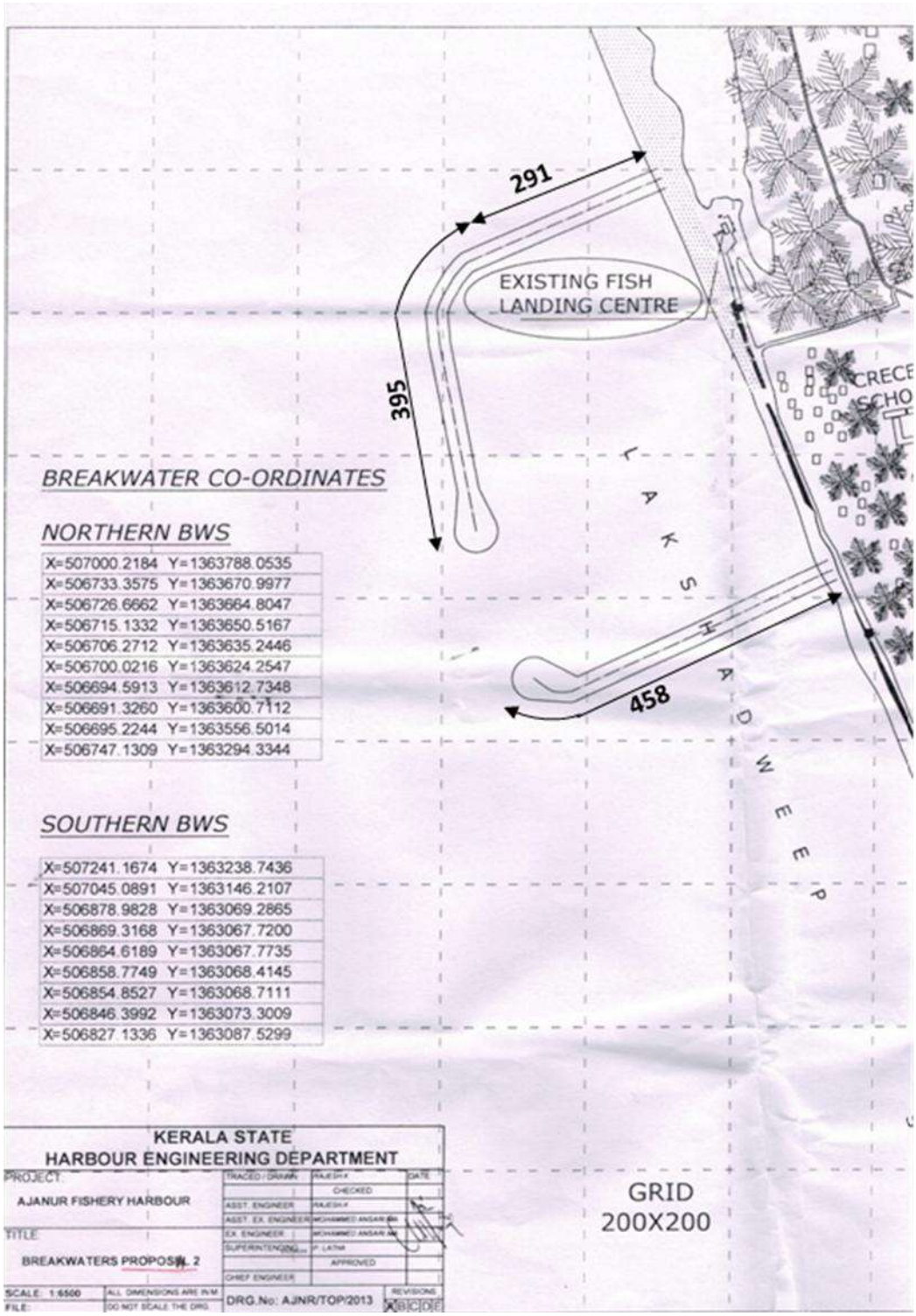


Figure 12. Proposed Layout 2

7.3 Layout 3

Based on the coordinates provided by the project authorities the southern breakwater is having a length of 334 m. The northern breakwater consists of shore normal breakwater of length 291 m which extends along the shore for an additional length of 520 m making the total length of the northern breakwater as 811 m. The breakwaters extend up to 4 m to 4.4 m depth (Figure 13). Depths inside the harbour have been considered as -3.0 m.

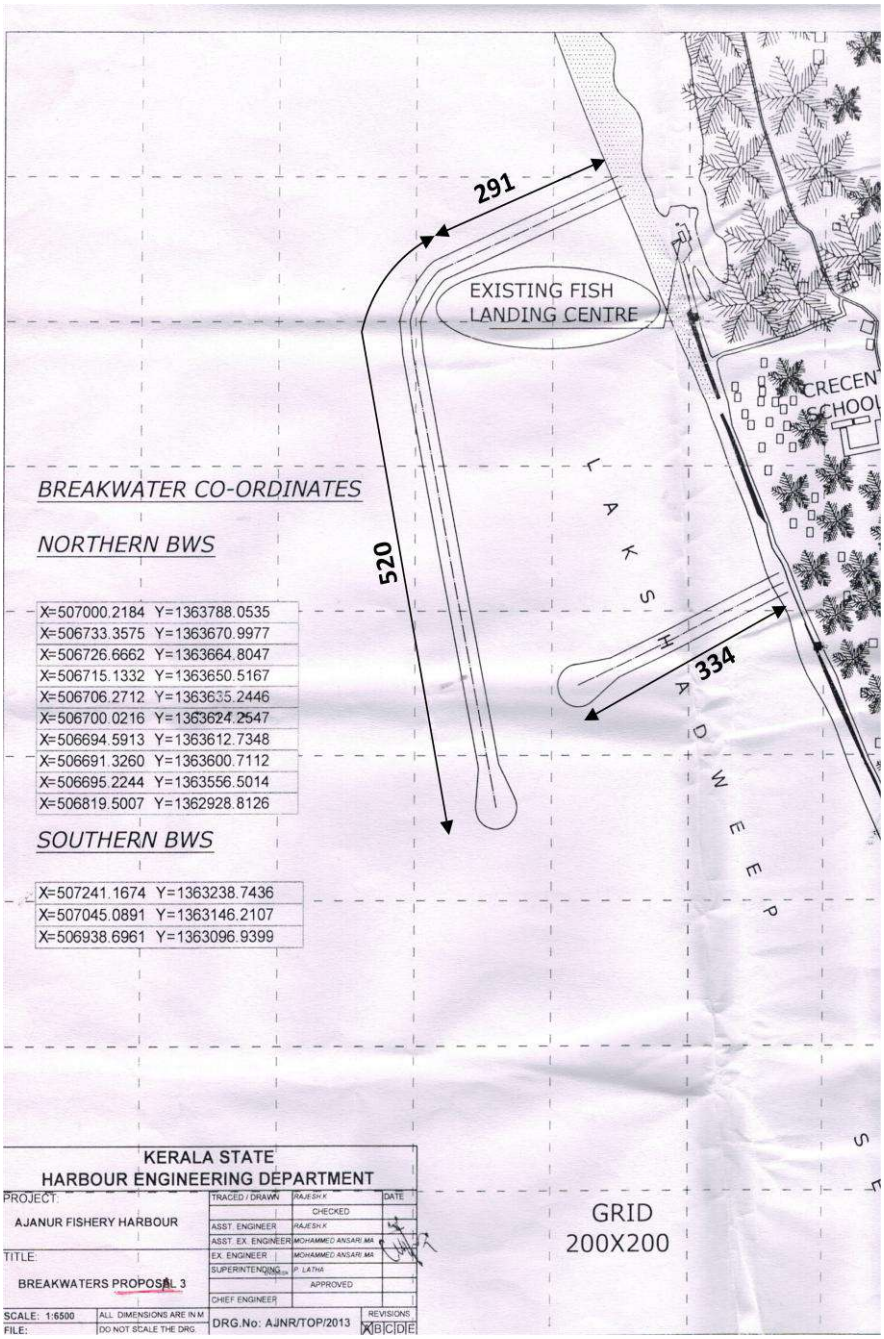


Figure 13. Proposed Layout 3

7.4 Layout 4

This Layout 4 was provided during the site visit to Ajanur, Kerala in August 2016. Based on the coordinates provided by the project authorities the southern breakwater is having a length of 375 m. The northern breakwater with 1000m length started at shore and extends along the shore as shown in Figure 14 below. The breakwaters extend up to 4 m to 4.5 m depth (Figure 14). Depths inside the harbour have been considered as -3.0 m.

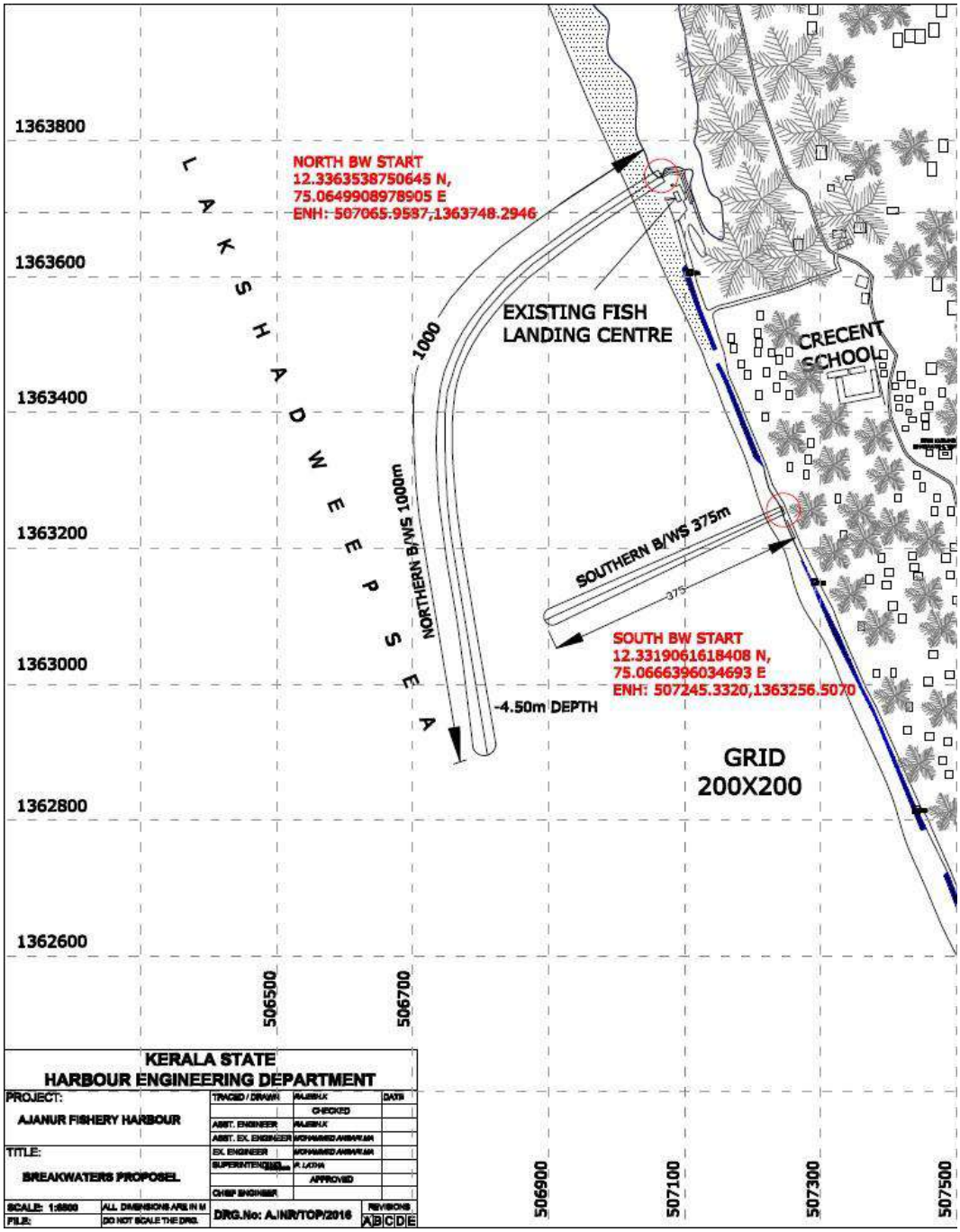


Figure 14. Proposed Layout 4

8. MIKE 21 BW

The Boussinesq Wave model, MIKE 21 BW, is the state-of-the-art numerical model for calculation and analysis of short and long-period waves in ports, harbours and coastal areas. MIKE 21 BW can also be used for detailed modeling of wave-induced current fields, surf zone dynamics and swash zone oscillations. The model is based on the numerical solution of the enhanced Boussinesq equations formulated by Madsen and Sørensen.

MIKE 21 BW is capable of reproducing the combined effects of all important wave phenomena of interest in port, harbour and coastal engineering. These include:

- Shoaling
- Refraction
- Diffraction
- Wave breaking
- Bottom friction
- Moving shoreline
- Partial reflection and transmission
- Non-linear wave-wave interaction
- Frequency spreading
- Directional spreading

9. WAVE PROPAGATION STUDY IN THE AJANUR HARBOUR FACILITY

Different sizes of the coastal areas were considered for wave propagation studies for the waves from different incident wave directions for all the three layouts are given in Table 12. Grid size in each case was 3m X 3m.

Table 12. Wave Height, Wave Direction and Model Size for Different Layouts

Sr. No	Wave Dir.	Wave Ht. (m)	Layout 1		Layout 2		Layout 3		Layout 4	
			X dir.	Y dir.	X dir.	Y dir.	X dir.	Y dir.	X dir.	Y dir.
1	SSW	1.5	2850	2700	2850	2700	2250	1800	5100	4500
2	SW	2.0	3000	2400	2400	2400	2100	1500	4200	3600
3	WSW	2.5	4200	4500	3600	2250	2100	1800	4050	4200
4	WEST	2.5	4200	4500	4200	3000	1950	1950	4200	4500
5	WNW	1.5	2850	2400	2700	2700	-	-	-	-

9.1 Studies with Layout 1

Layout 1 as stated earlier consists of north and south breakwaters. The north breakwater is of length 335m. The southern breakwater consists of shore normal breakwater of length 270m which is extended along shore breakwater of length 340m. The breakwaters extend up to 4 m to 4.4 m depth (Figure 11). Bathymetry (Figure 15), surface elevation plot (Figure 16) of the wave propagation for one output is given as representative plot and contours of the wave height in the port for incident wave directions from SSW, SW, WSW, West and WNW are presented below. Wave height distribution plot in the entire study area and zoomed in view of the harbour is given in Figure 17 to Figure 26 respectively for SSW, SW, WSW, West and WNW directions.

9.2 Bathymetry, Surface Water Level and Wave Height Distribution plot for Layout 1

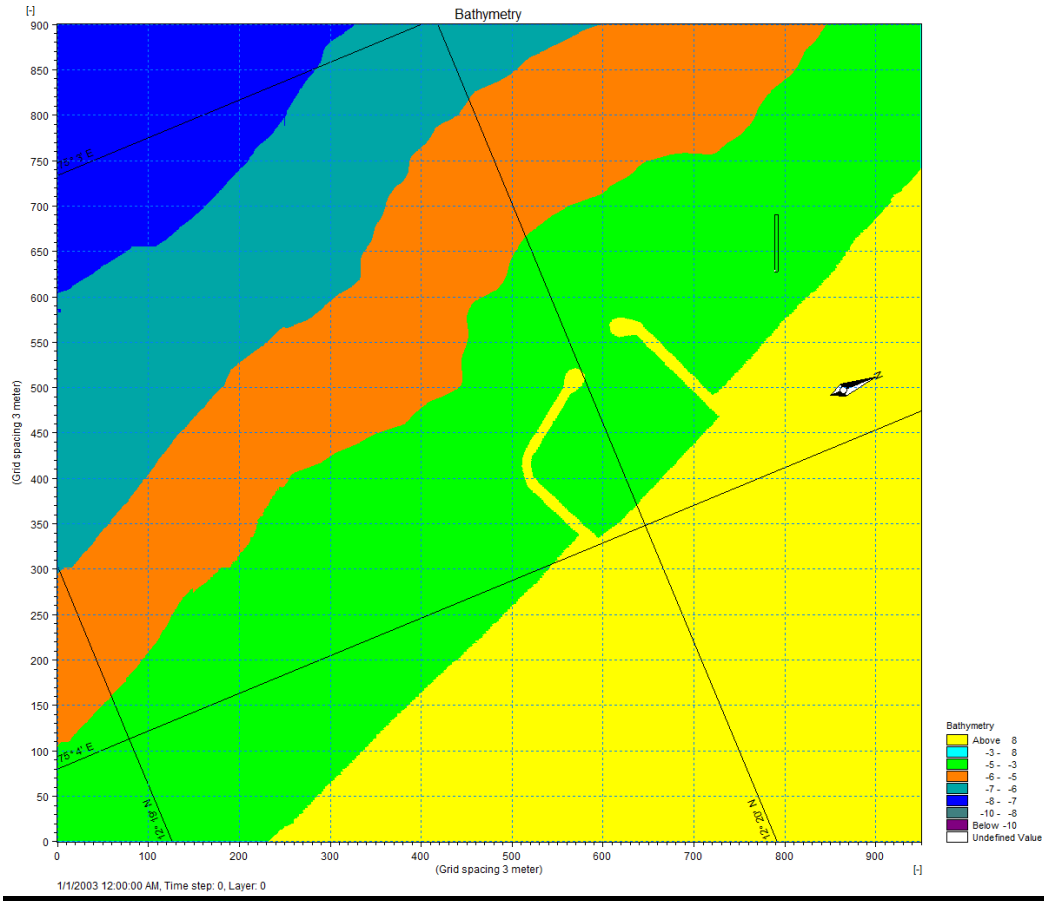


Figure 15. Sample Bathymetry Plot for Layout 1

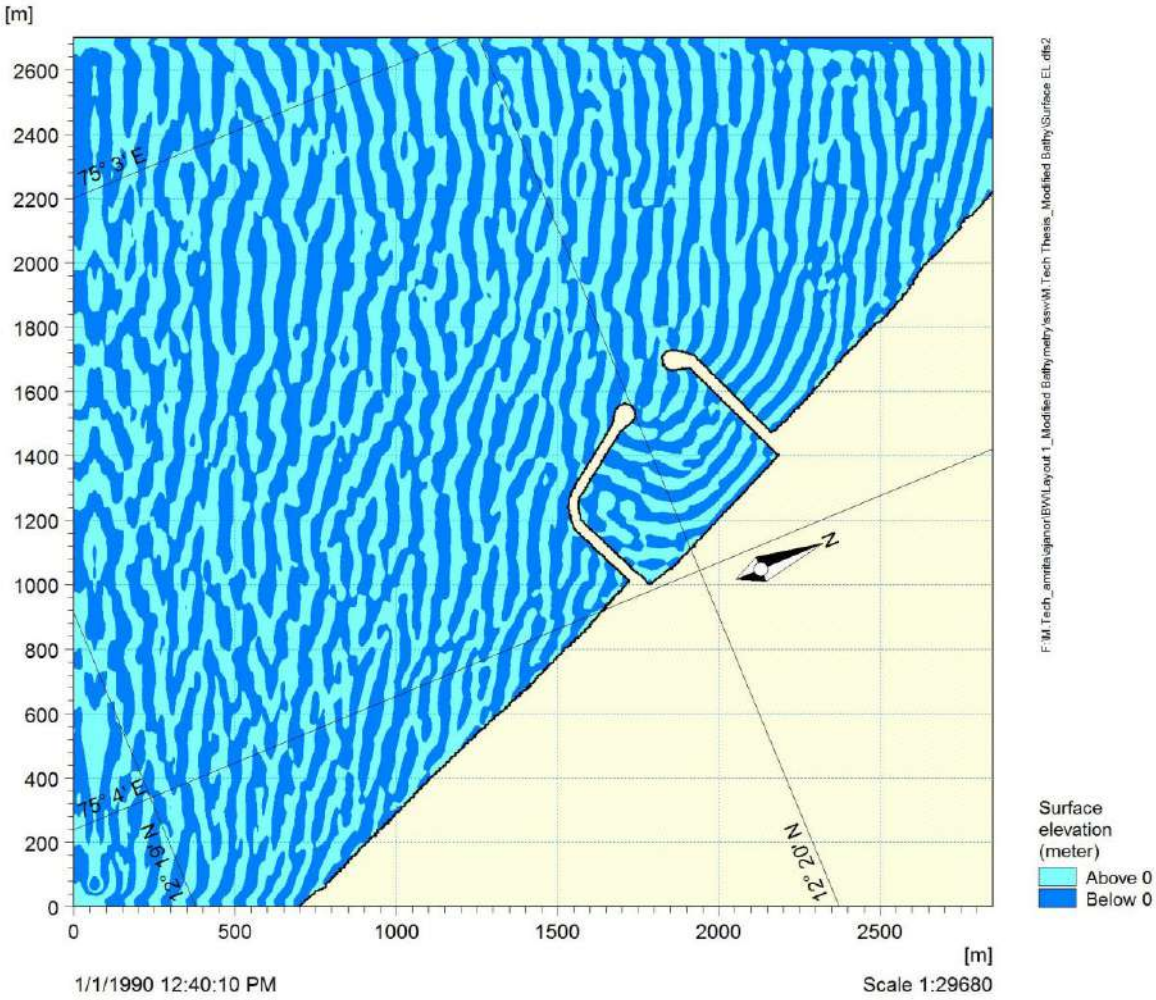


Figure 16. Sample Water Surface Elevation Plot for Layout 1

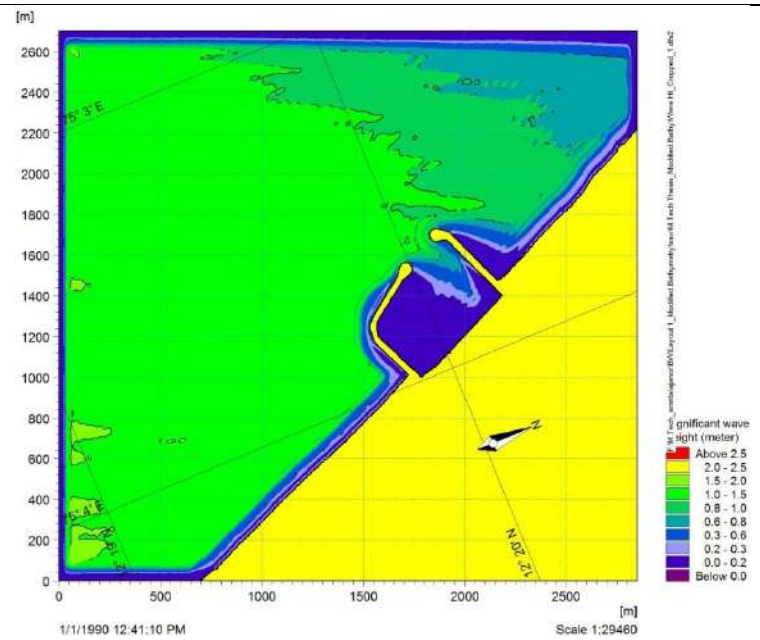


Figure 17. Wave Height Distribution Plot
Wave Direction - SSW, Wave Height - 1.5m

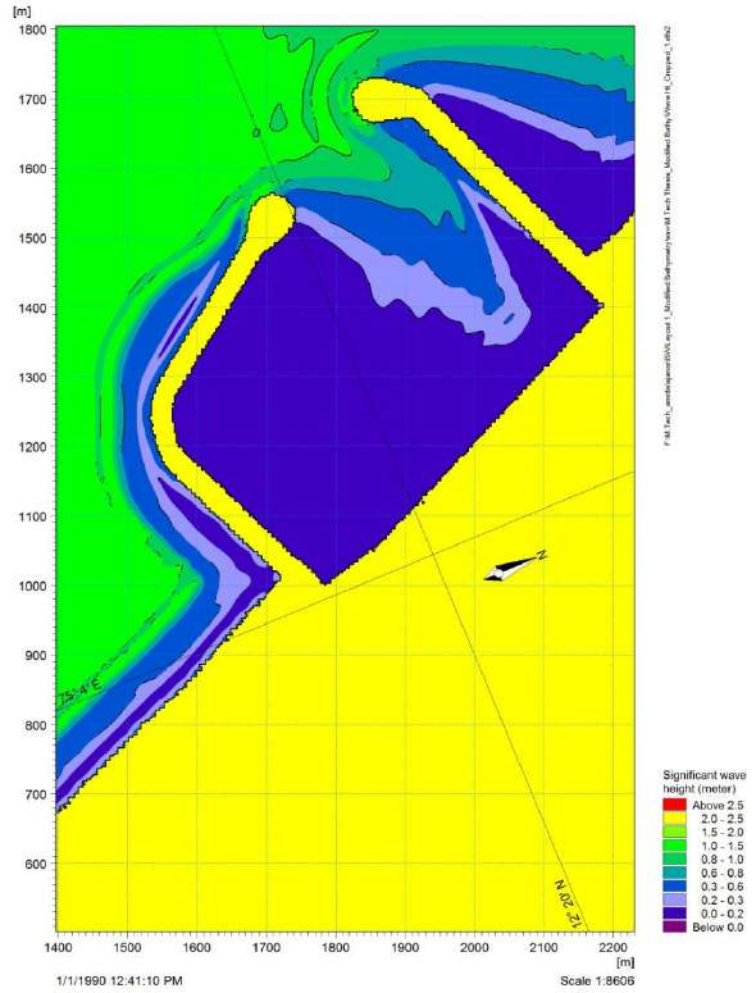


Figure 18. Zoomed View of Figure 17

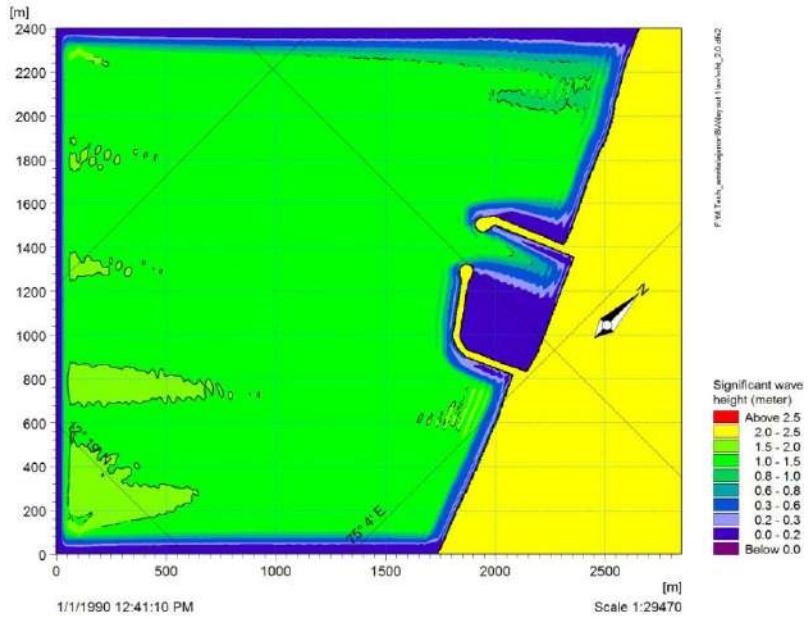


Figure 19. Wave Height Distribution Plot
Wave Direction - SW, Wave Height - 2.0 m

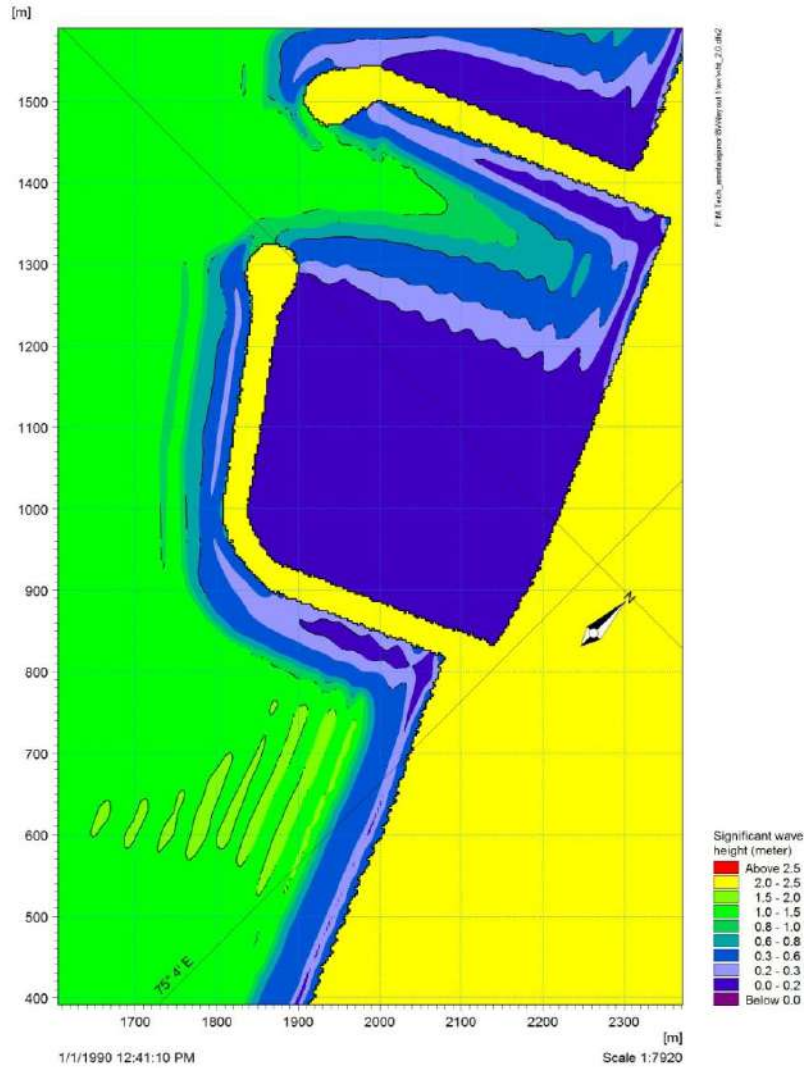


Figure 20. Zoomed in view of Figure 19

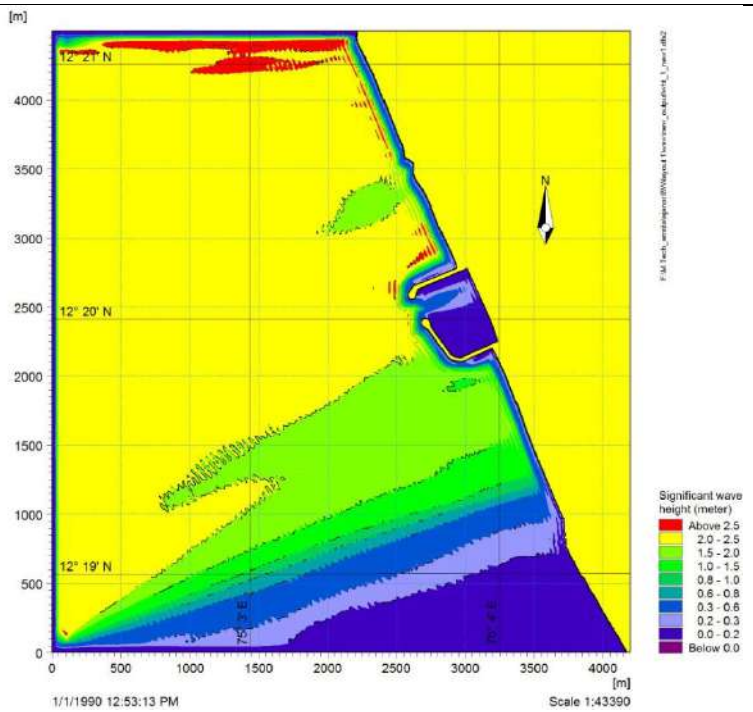


Figure 21. Wave Height Distribution Plot
Wave Direction - WSW, Wave Height - 2.5 m

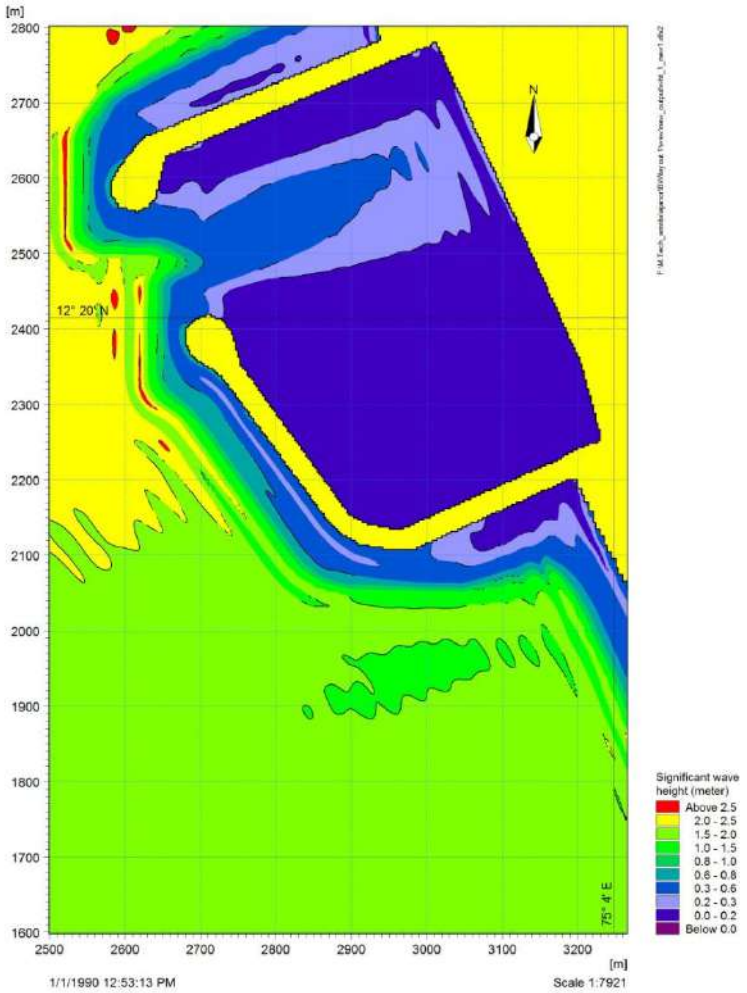


Figure 22. Zoomed in view of Figure 21

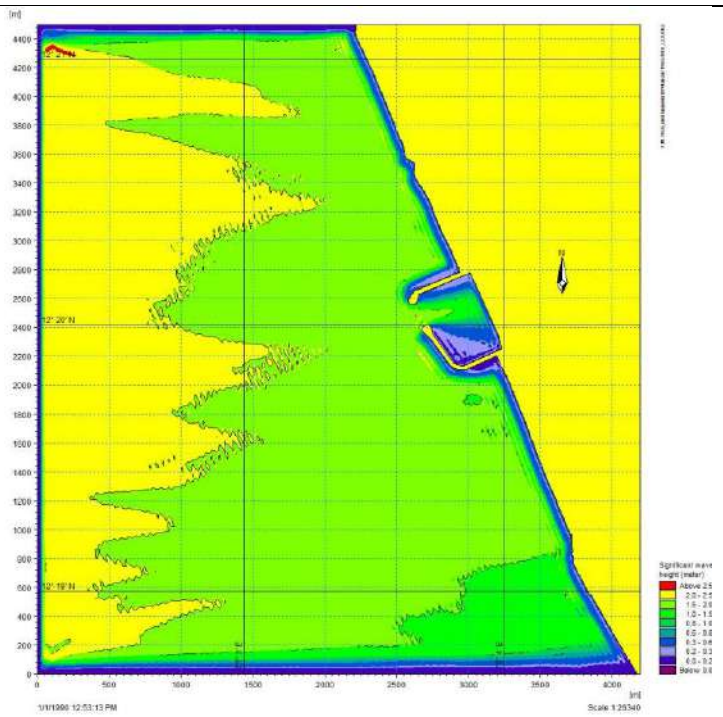


Figure 23. Wave Height Distribution Plot
Wave Direction - West , Wave Height - 2.5 m

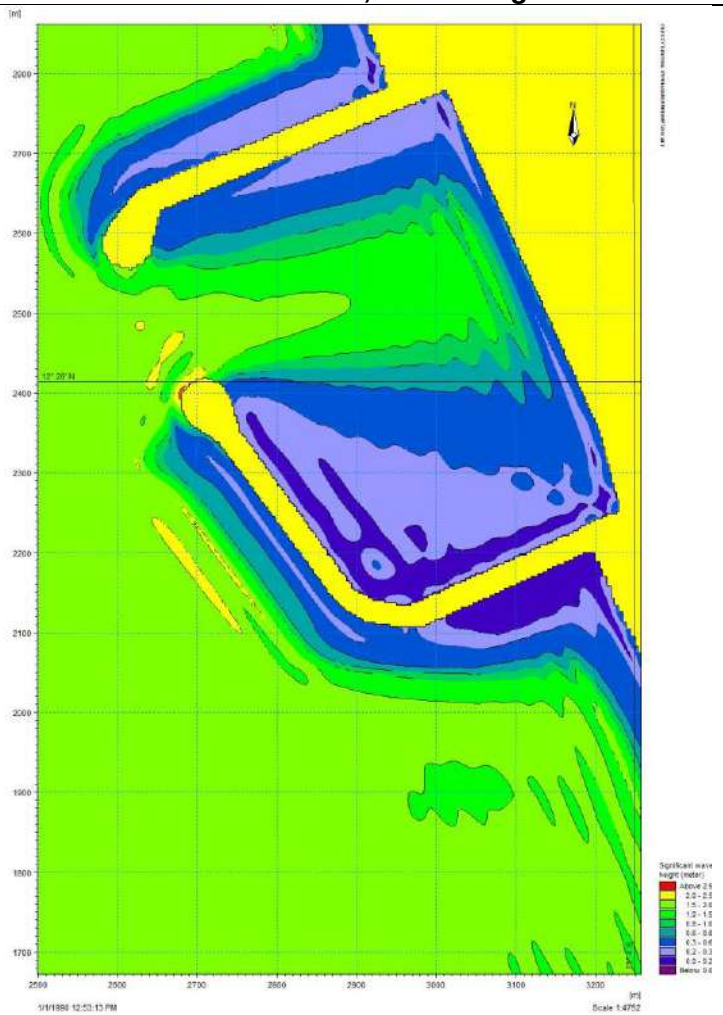


Figure 24. Zoomed in view of Figure 23

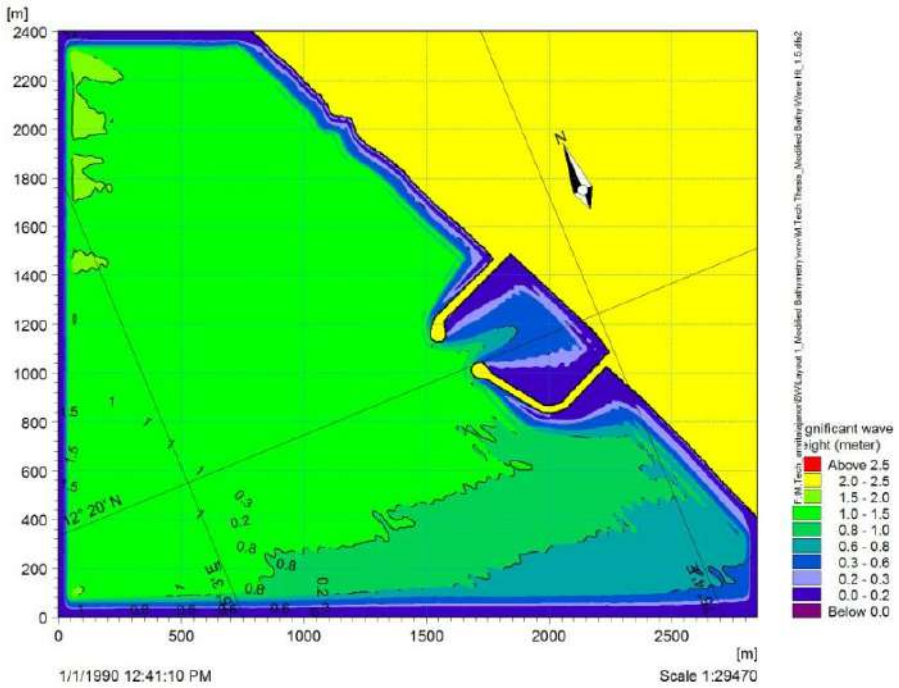


Figure 25. Wave Height Distribution Plot
Wave Direction - WNW , Wave Height - 1.5 m

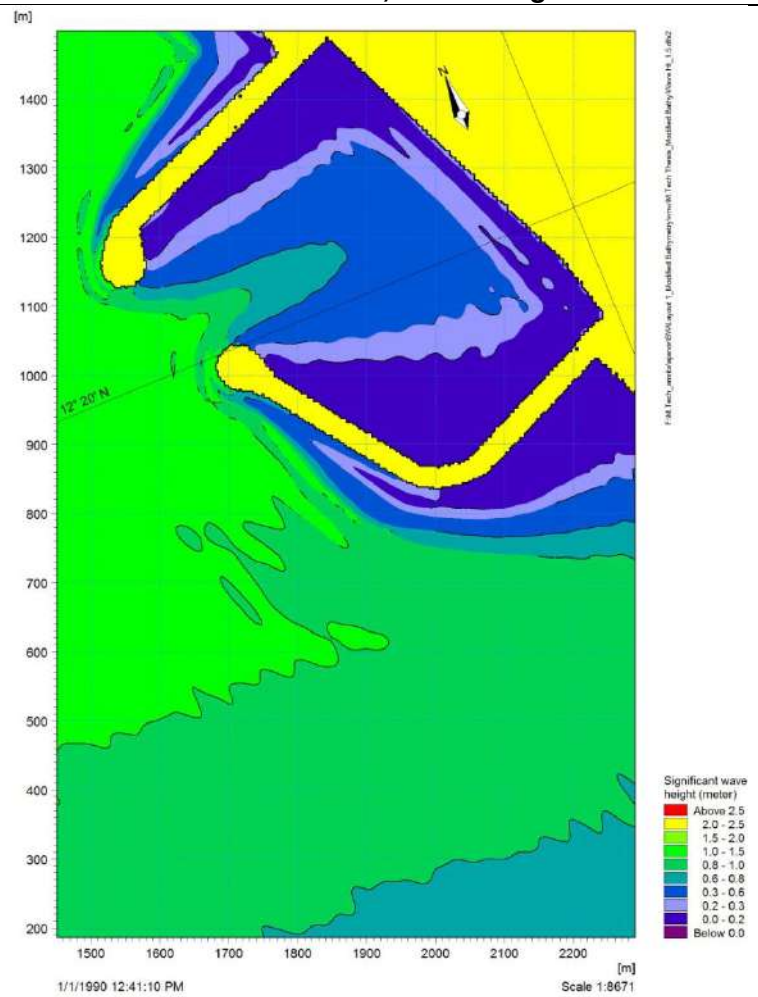


Figure 26. Zoomed in view of Figure 25

9.3 Results of Layout 1

Initially the model was operated for the incident wave height of 1.5 m from SSW direction. The Bathymetry for the simulation and surface elevation and wave distribution obtained by the model are shown in Figure 15, Figure 16 and Figure 17 & Figure 18 respectively. From these Figures and the Table 13, it could be seen that the wave heights in the Northern area are in the range of 0.30 – 1.41 m with the average of 0.58 m. An area of about 19.95% is having waves more than tranquility limit of more than 0.3 m. In the central portion and southern portion of the harbour are having wave heights within 0.3 m.

Next, the model was operated for the incident wave height of 2.0 m from SW direction. Since the bathymetry for Layout 1 is going to be the same for all the direction runs, bathymetry for SSW as representative only has been given and bathymetry for other directions has not been reproduced. Surface water elevation plot is the representative of wave propagation therefore only one sample plot has been given for SSW direction. Wave height distribution plot for SW is given in Figure 19 & Figure 20. From these Figures, and the Table 13 it could be seen that the wave heights in the Northern area are in the range of 0.30 – 1.57 m with the average of 0.69 m. An area of about 28.68% is having waves more than tranquility limit of more than 0.3 m. In the central portion and southern portion of the harbour are having wave heights with in 0.3 m.

Then, the model was operated for the incident wave height of 2.5 m and direction WSW. Wave height distribution plot for WSW is given in Figure 21 & Figure 22. From these Figures, and the Table 13 it could be seen that the wave heights in the Northern area are in the range of 0.30 – 2.52 m with the average of 1.02 m. An area of about 48.04% is having waves more than tranquility limit of more than 0.3 m. In the central portion and southern portion of the harbour are having wave heights with in 0.3 m.

Then, the model was operated for the incident wave height of 2.5 m and direction west. Wave height distribution plot for WSW is given in Figure 23 & Figure 24. From these Figures, and the Table 13 it could be seen that the wave heights in the Northern area are in the range of 0.30 – 0.8 m with the average of 0.4 m. An area of about 4.36% is having waves more than tranquility limit of more than 0.3 m. In the central portion and southern portion of the harbour are having wave heights with in 0.3 m.

Then, the model was operated for the incident wave height of 1.5 m and direction WNW. Wave height distribution plot for WSW is given in Figure 25 & Figure 26. From these Figures, and the Table 13 it could be seen that the wave heights in the north and central portion is having the wave heights in the range of 0.30 – 1.31 m with the average of 0.50 m. An area of about 41.28% is having waves more than tranquility limit of more than 0.3 m. Southern portion of the harbour is having wave heights with in 0.3 m.

Table 13. Wave Heights in the harbour for the input wave conditions (Layout 1)

Wave Direction	Wave Height (m)	Area (%) having more than 0.3 m wave height	Average wave height in the area given in col. 3 (m)	Highest wave height in the harbour (m)
SSW	1.5	19.95	0.58	1.41
SW	2.0	28.68	0.69	1.57
WSW	2.5	48.04	1.02	2.52
West	2.5	62.21	0.84	2.51
WNW	1.5	41.28	0.50	1.13

9.4 Bathymetry, Surface Water Level and Wave Height Distribution plot for Layout 2

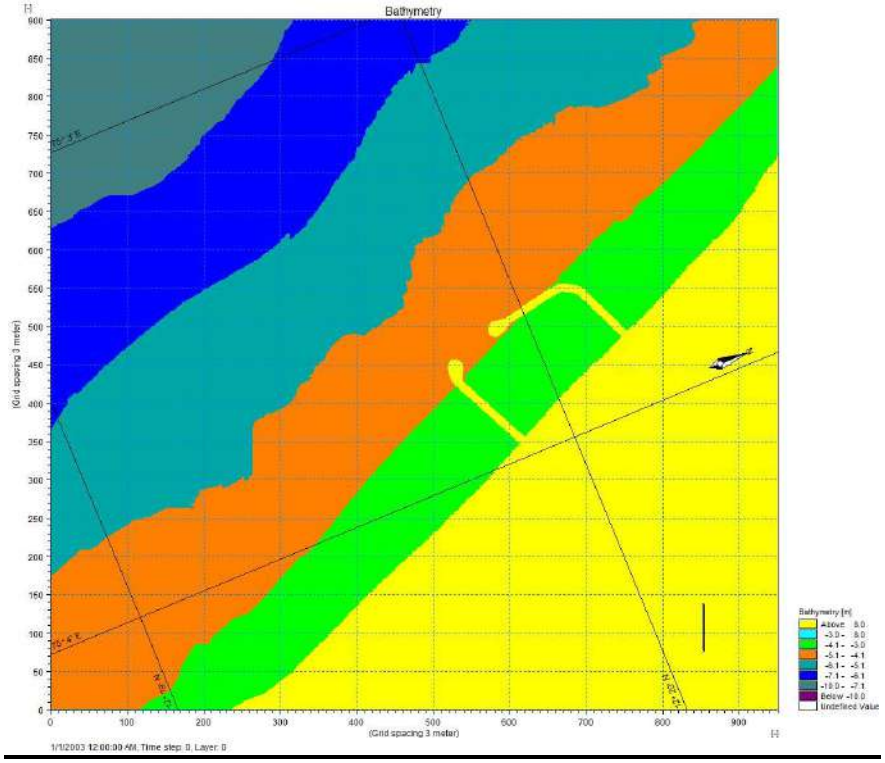


Figure 27. Sample Bathymetry Plot for Layout 2

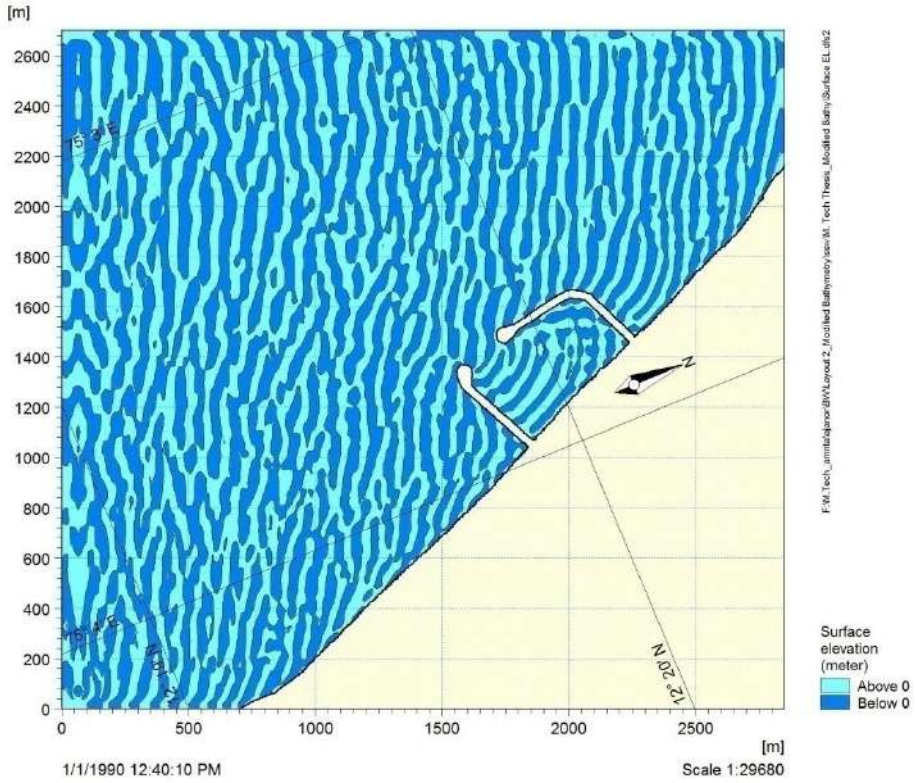


Figure 28. Sample Water Surface Elevation Plot for Layout 2

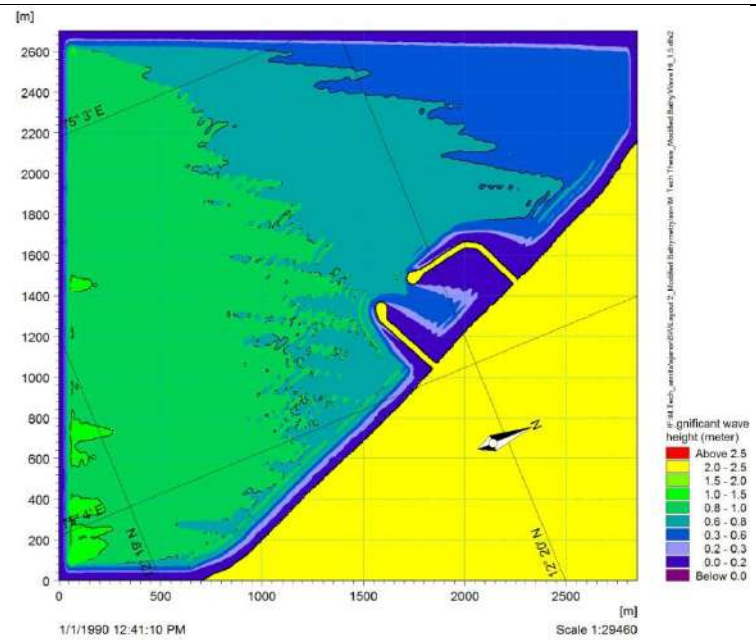


Figure 29. Wave Height Distribution Plot
Wave Direction - SSW, Wave Height - 1.5 m

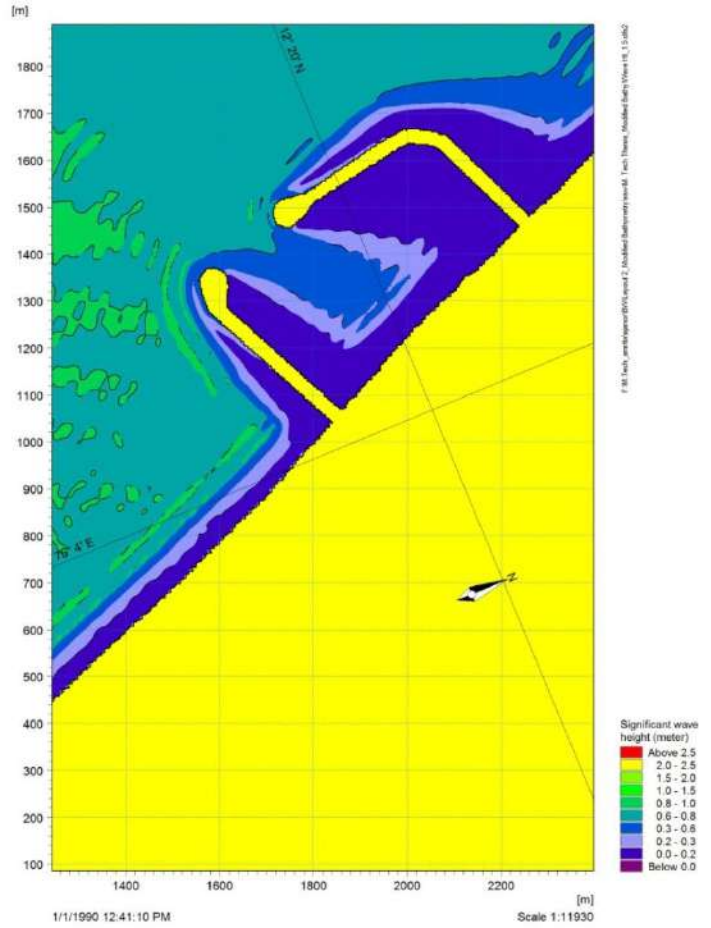


Figure 30. Zoomed in view of Figure 29

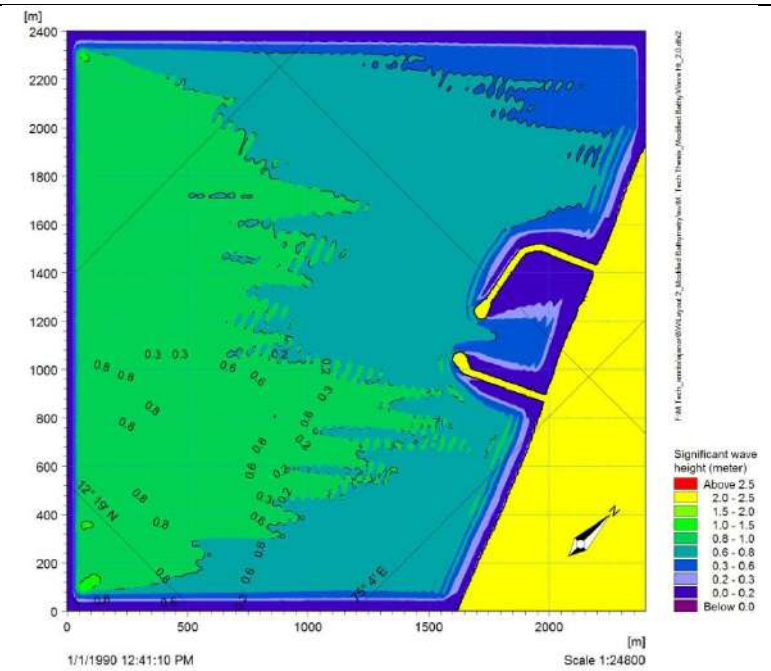


Figure 31. Wave Height Distribution Plot
Wave Direction - SW, Wave Height – 2.0 m

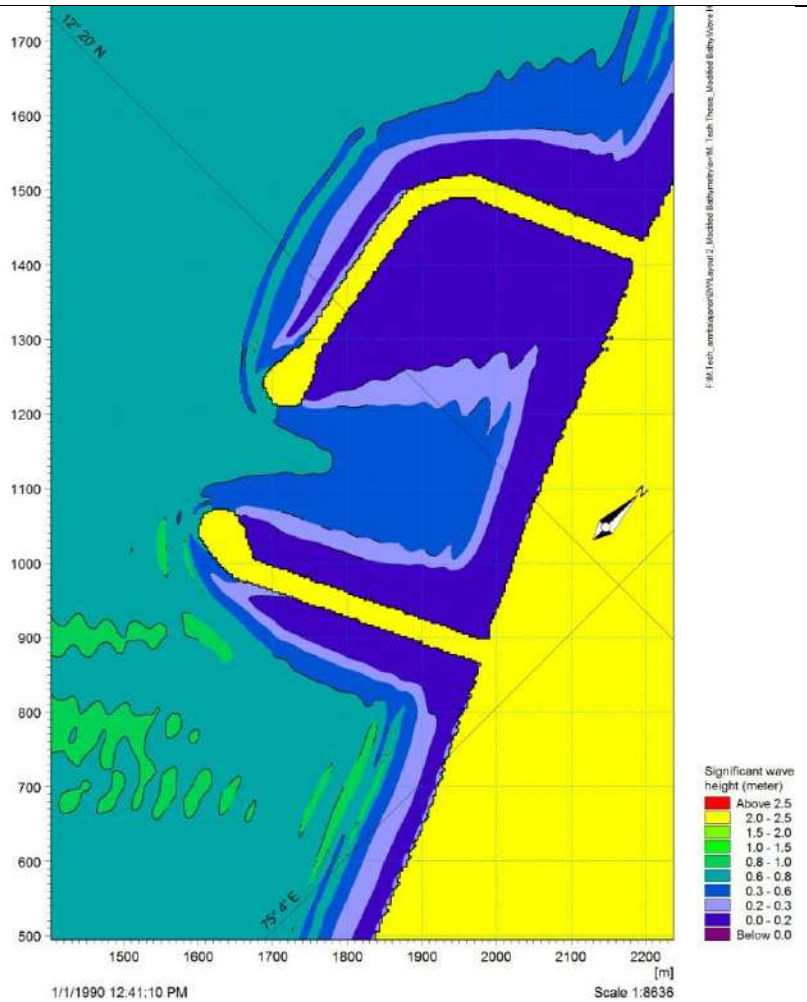


Figure 32. Zoomed in view of Figure 31

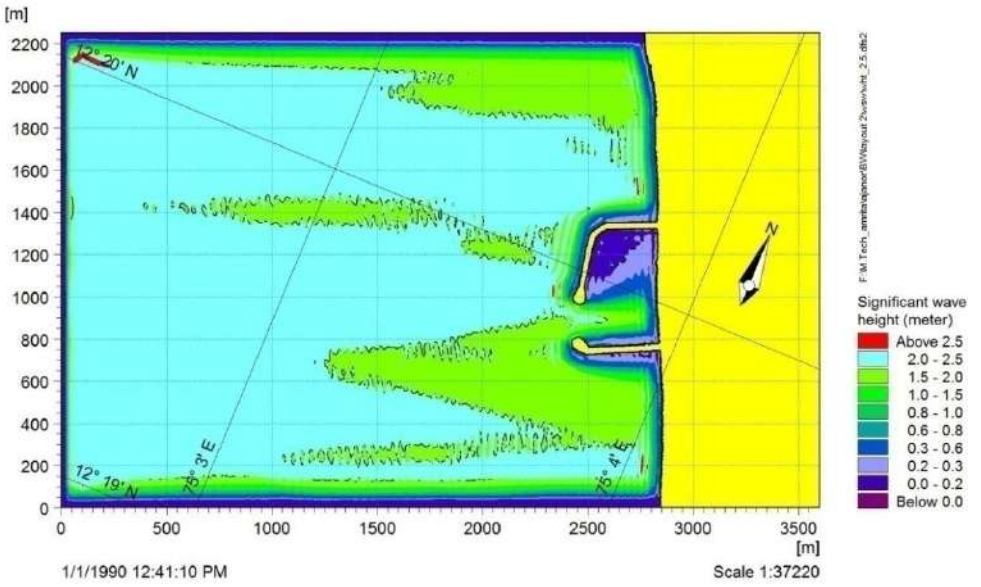


Figure 33. Wave Height Distribution Plot
Wave Direction - WSW, Wave Height - 2.5 m

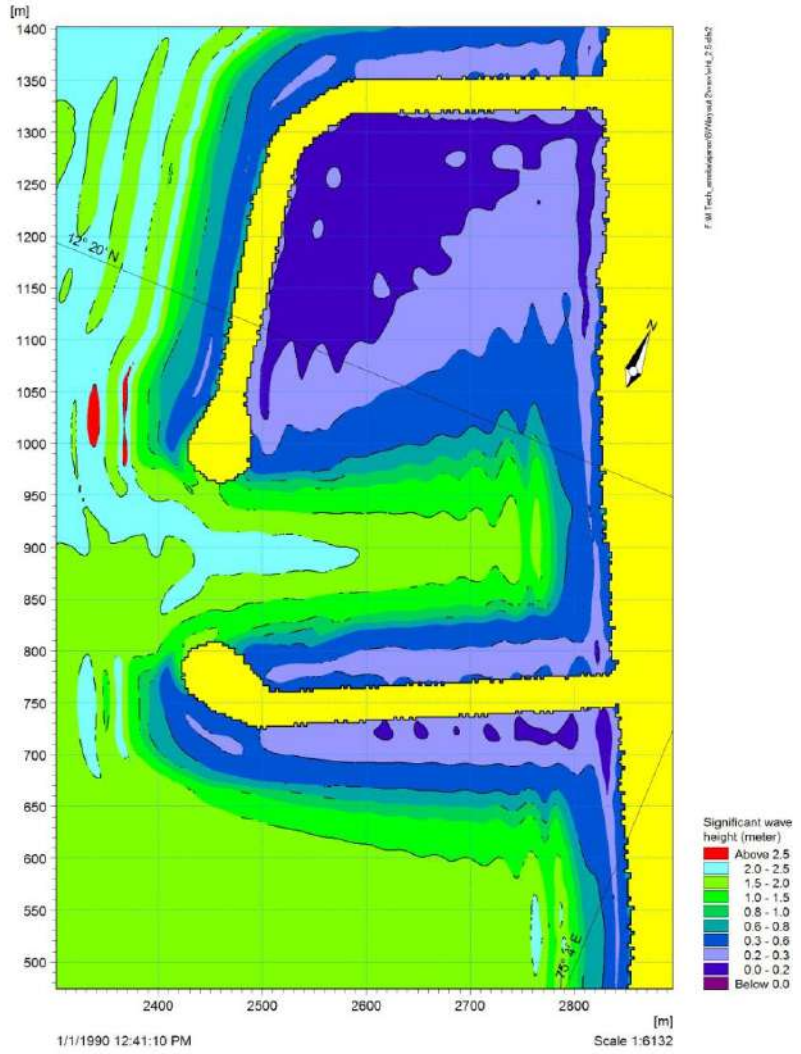


Figure 34. Zoomed in view of Figure 33

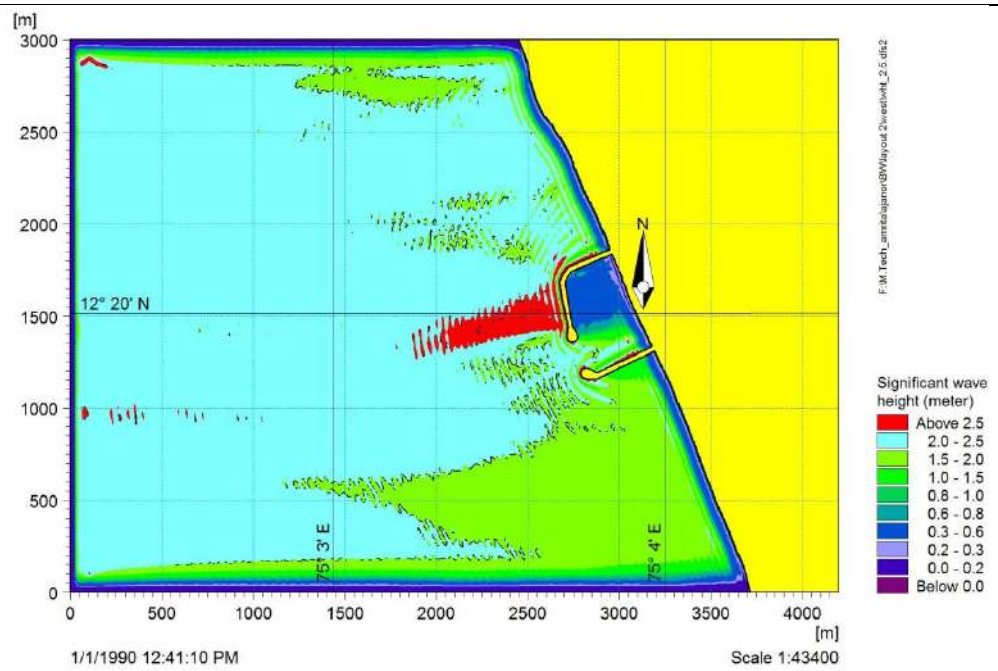


Figure 35. Wave Height Distribution Plot
Wave Direction - West, Wave Height - 2.5 m

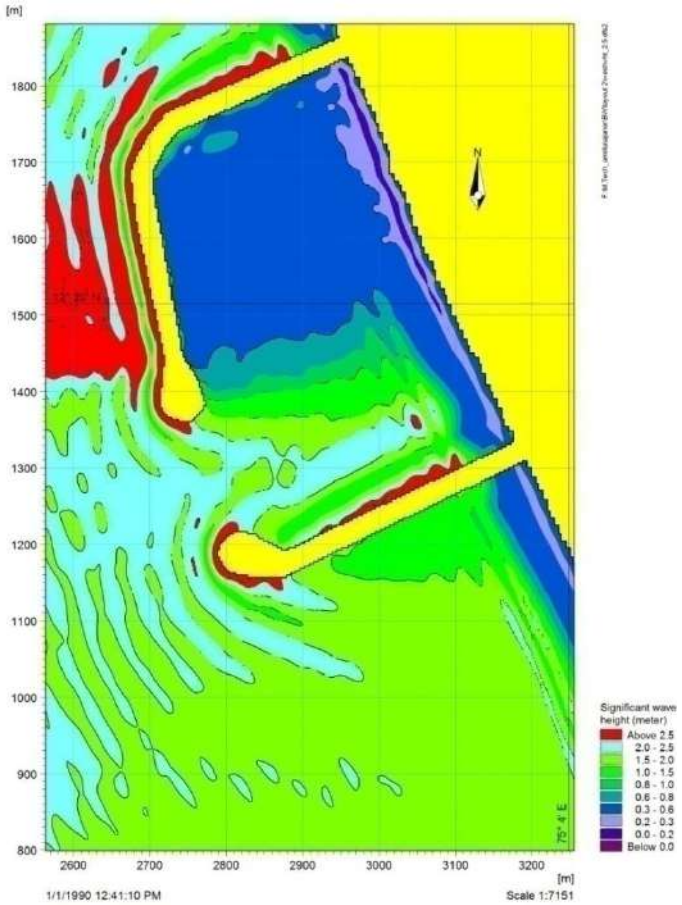


Figure 36. Zoomed in view of Figure 35

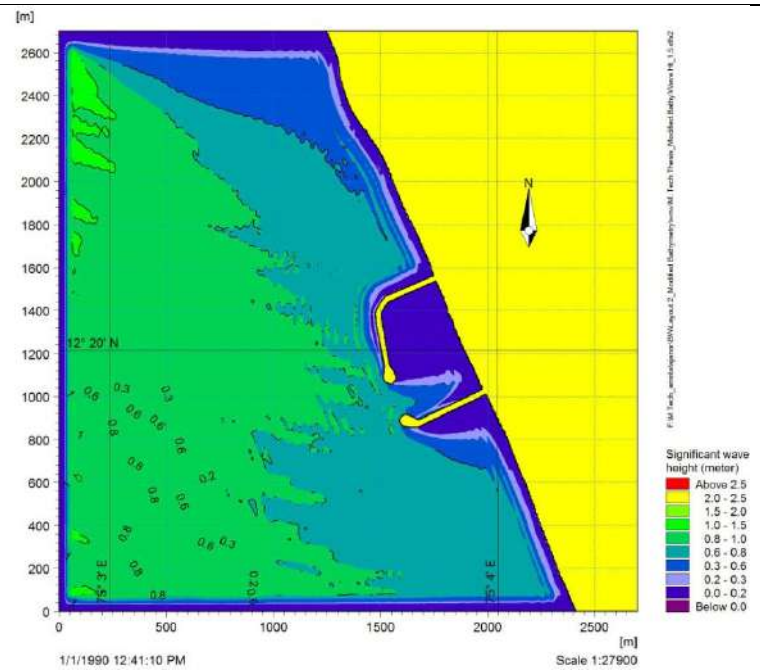


Figure 37. Wave Height Distribution Plot
Wave Direction - WNW, Wave Height - 1.5 m

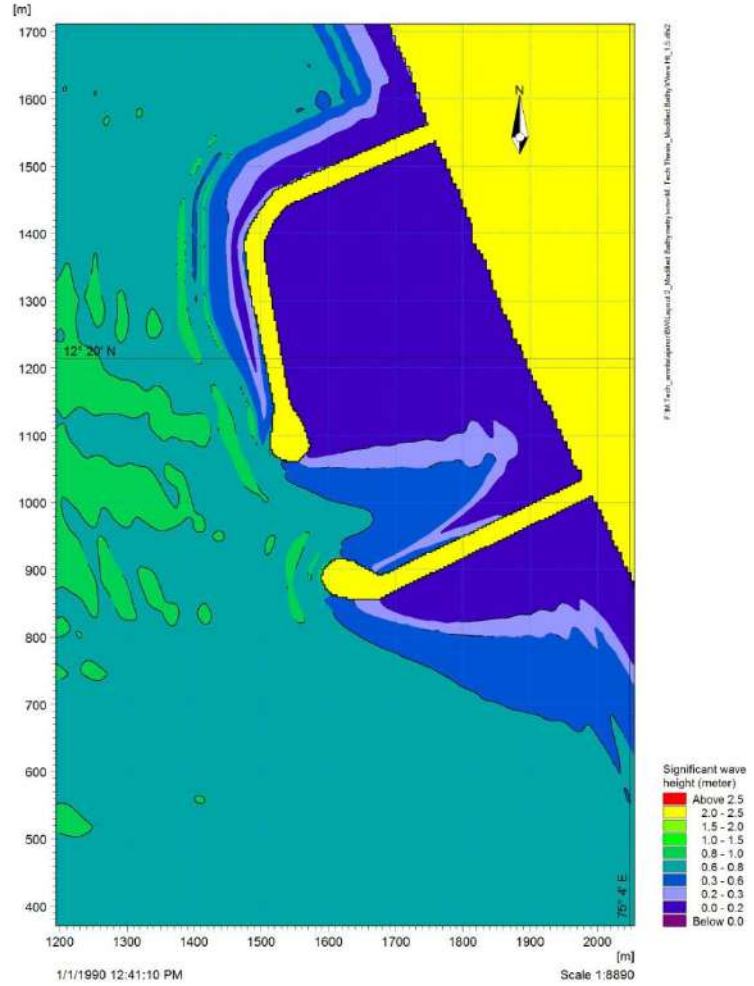


Figure 38. Zoomed in view of Figure 37

9.5 Results of Layout 2

Initially the model was operated for the incident wave height of 1.5 m from SSW direction. The Bathymetry for the simulation and surface elevation and wave distribution obtained by the model are shown in Figure 27 to Figure 30 respectively. From these Figures and the Table 14, it could be seen that the wave heights in the southern portion is in the range of 0.30 – 1.2 m with the average of 0.52 m. An area of about 38.01% is having waves more than tranquility limit of more than 0.3 m. In the central portion and northern portion of the harbour are having wave heights with in 0.3 m.

Next, the model was operated for the incident wave height of 2.0 m from SW direction. Since the bathymetry for Layout 2 is going to be the same for all the direction runs, bathymetry for SSW as representative only has been given and bathymetry for other directions has not been reproduced. Surface water elevation plot is the representative of wave propagation therefore only one sample plot has been given for SSW direction. Wave height distribution plot for SW is given in Figure 31 & Figure 32. From these Figures and the Table 14, it could be seen that the wave heights in the southern area is in the range of 0.30 – 1.52 m with the average of 0.68 m. An area of about 55.31% is having waves more than tranquility limit of more than 0.3 m. Less than half of the harbour is having wave heights with in 0.3 m.

Then, the model was operated for the incident wave height of 2.5 m and direction WSW. Wave height distribution plot for WSW is given in Figure 33 & Figure 34. From these Figures and the Table 14, it could be seen that the wave heights in the Northern area are in the range of 0.30 – 2.52 m with the average of 1.02 m. An area of about 48.04% is having waves more than tranquility limit of more than 0.3 m. In the central portion and southern portion of the harbour are having wave heights with in 0.3 m.

Then, the model was operated for the incident wave height of 2.5 m and direction West. Wave height distribution plot for WSW is given in Figure 35 & Figure 36. From these Figures and the Table 14, it could be seen that the wave heights in the southern area are in the range of 0.30 – 0.8 m with the average of 0.4 m. An area of about 4.36% is having waves more than tranquility limit of more than 0.3 m. In the central portion and Northern portion of the harbour are having wave heights with in 0.3 m.

Then, the model was operated for the incident wave height of 1.5 m and direction WNW. Wave height distribution plot for WNW is given in Figure 37 & Figure 38. From these Figures and Table 14, it could be seen that the wave heights in the central and southern portion is having the wave heights in the range of 0.30 – 1.31 m with the average of 0.50 m. An area of about 41.28% is having waves more than tranquility limit of more than 0.3 m. Northern portion of the harbour is having wave heights with in 0.3 m.

Table 14. Wave Heights in the harbour for the input wave conditions (Layout 2)

Wave Direction	Wave Height (m)	Area (%) having more than 0.3 m wave height	Average wave height in the area given in col. 3 (m)	Highest wave height in the harbour (m)
SSW	1.5	38.01	0.52	1.20
SW	2.0	55.31	0.68	1.52
WSW	2.5	51.64	0.98	2.28
West	2.5	92.69	0.93	3.99
WNW	1.5	23.41	0.58	1.13

9.6 Bathymetry, Surface Water Level and Wave Height Distribution plot for Layout 3

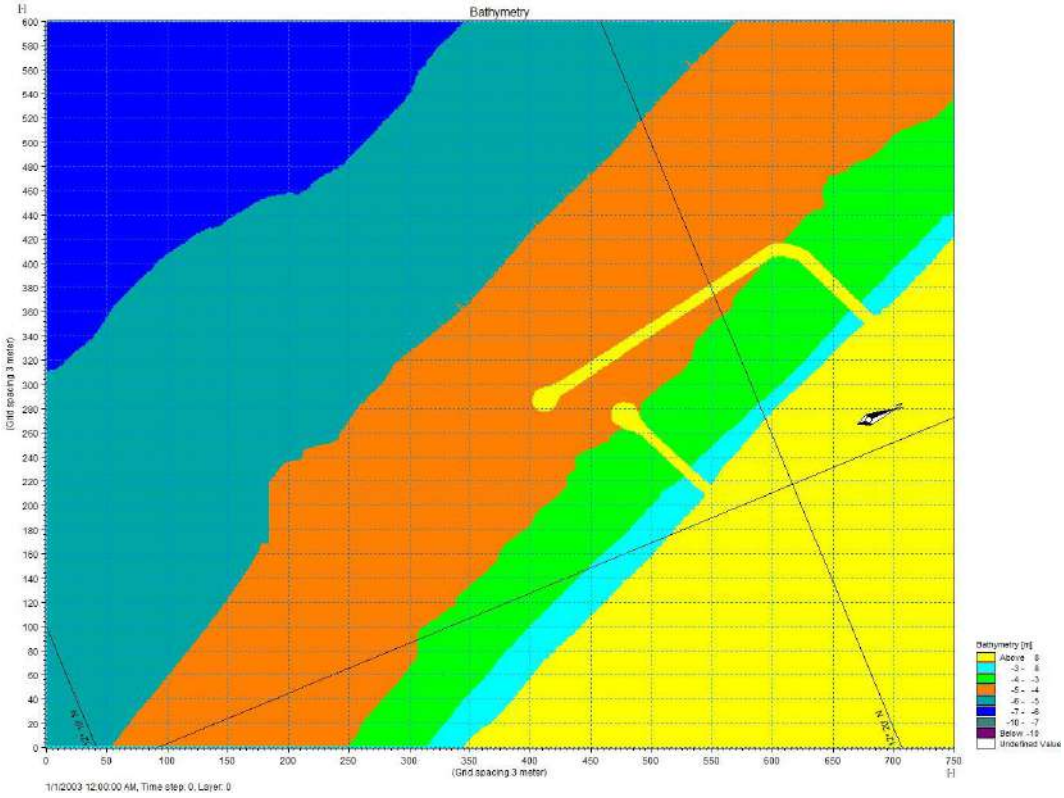


Figure 39. Sample Bathymetry for Layout 3

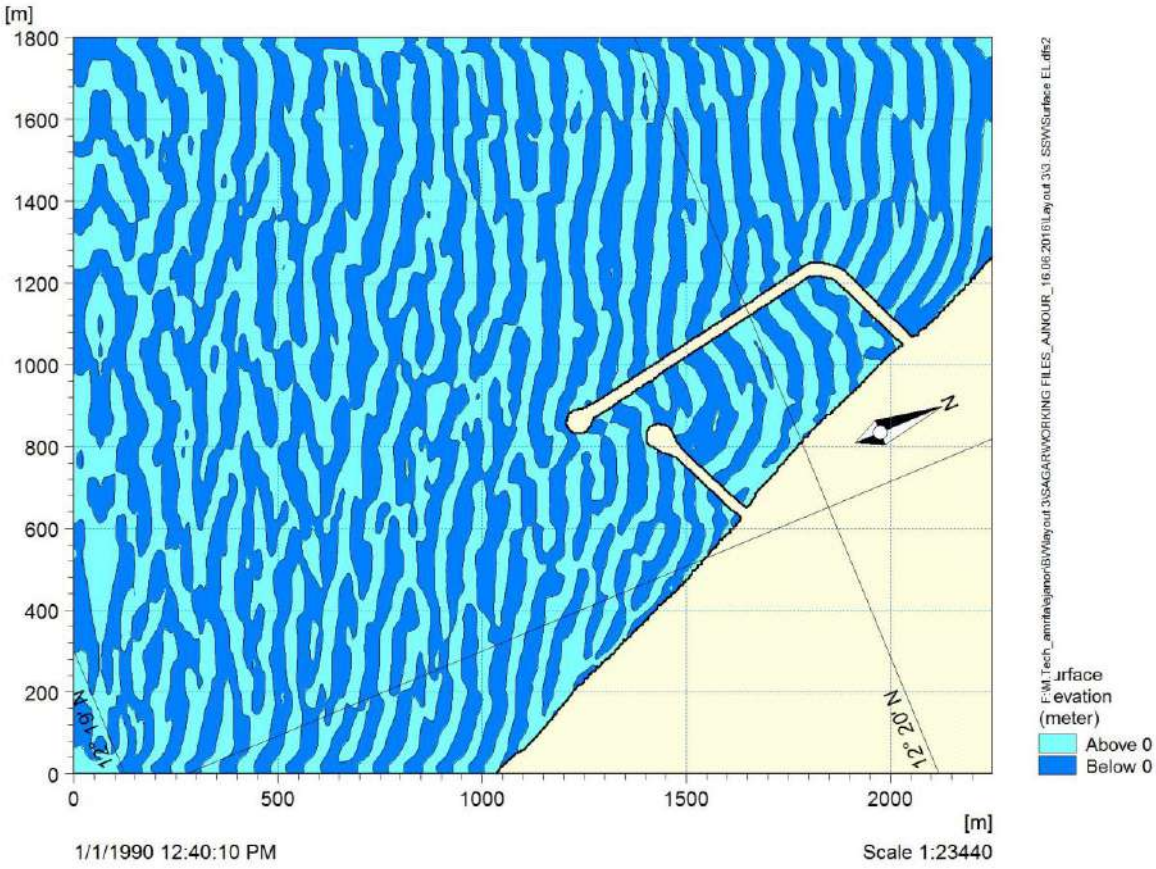


Figure 40. Sample Surface Water Distribution Plot for Layout 3

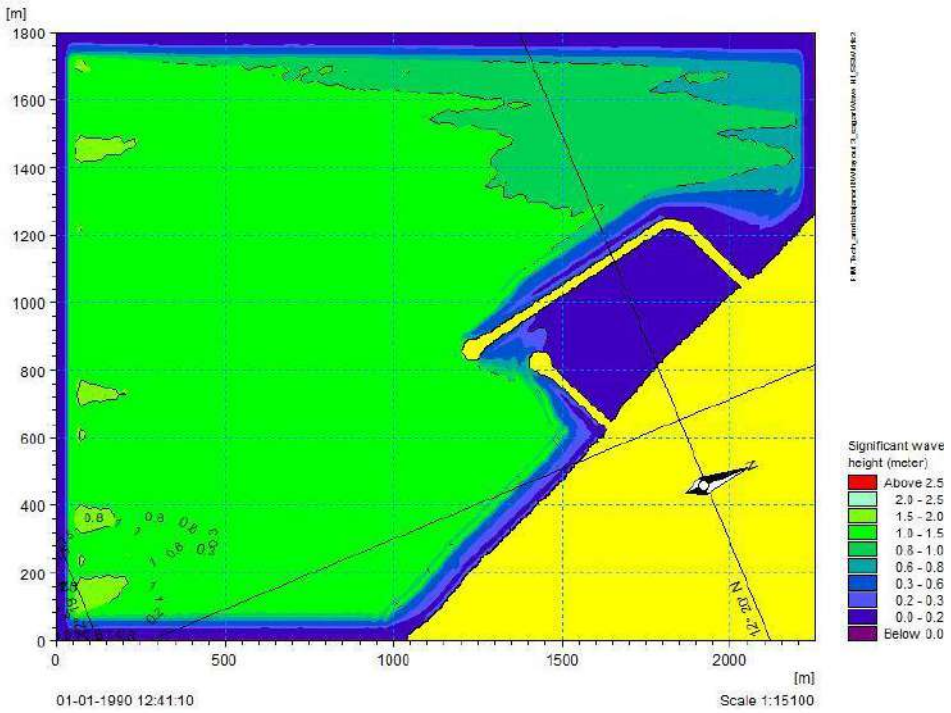


Figure 41. Wave Height Distribution Plot
Wave Direction - SSW, Wave Height - 1.5 m

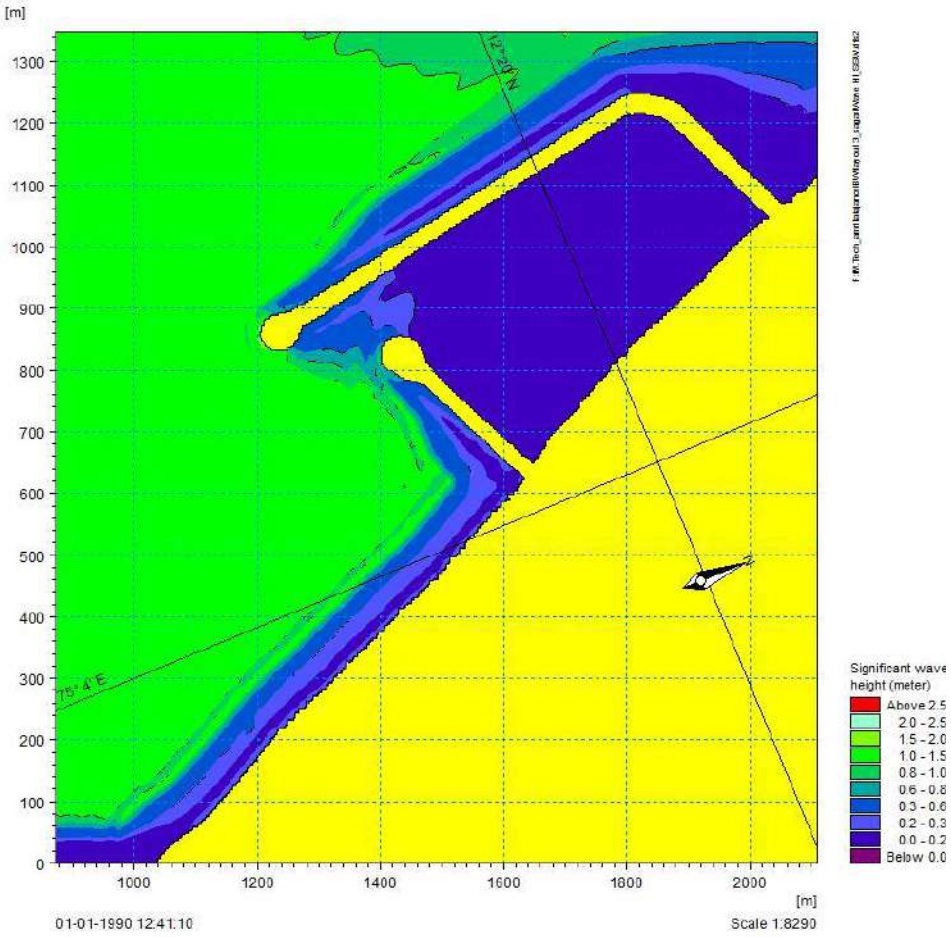


Figure 42. Zoomed in view of Figure 41

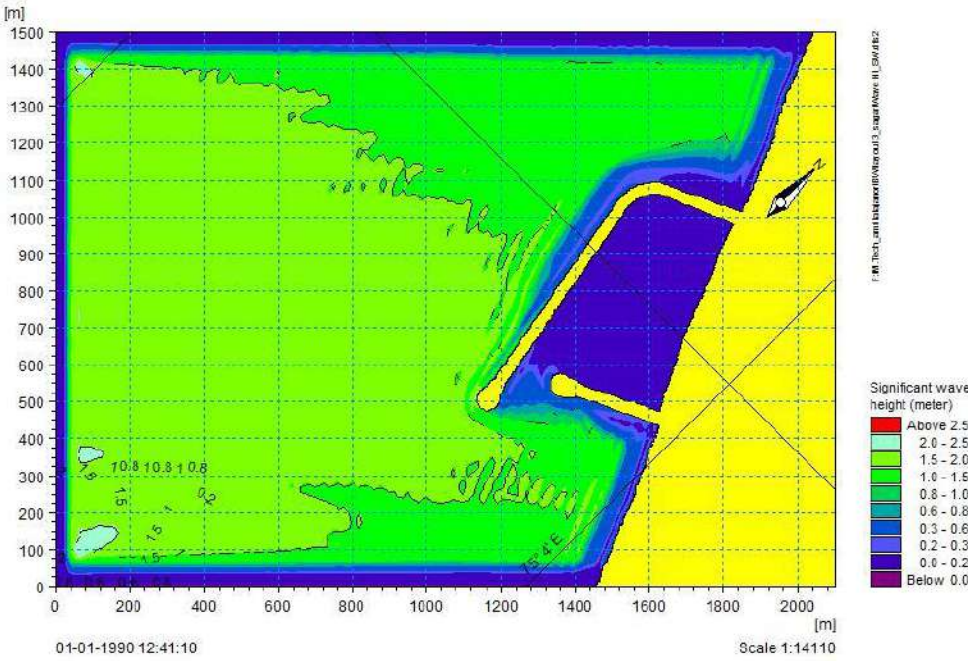


Figure 43. Wave Height Distribution Plot
Wave Direction - SW, Wave Height - 2.0 m

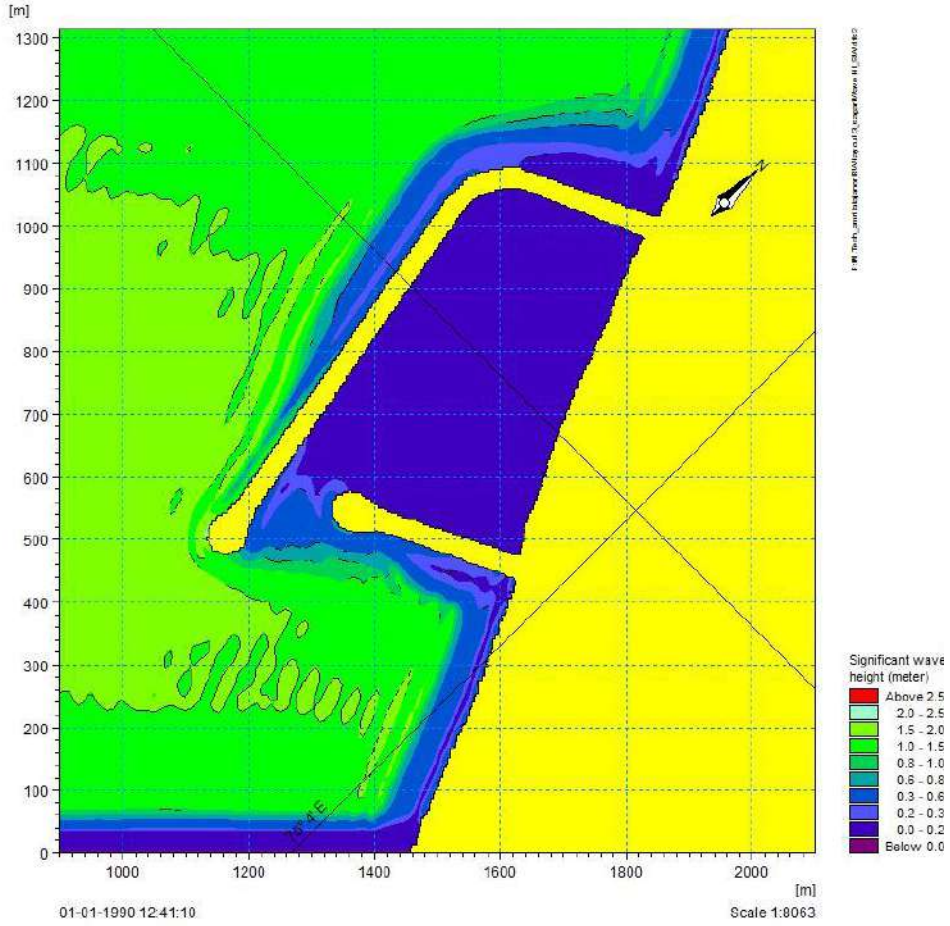


Figure 44. Zoomed in view of Figure 43

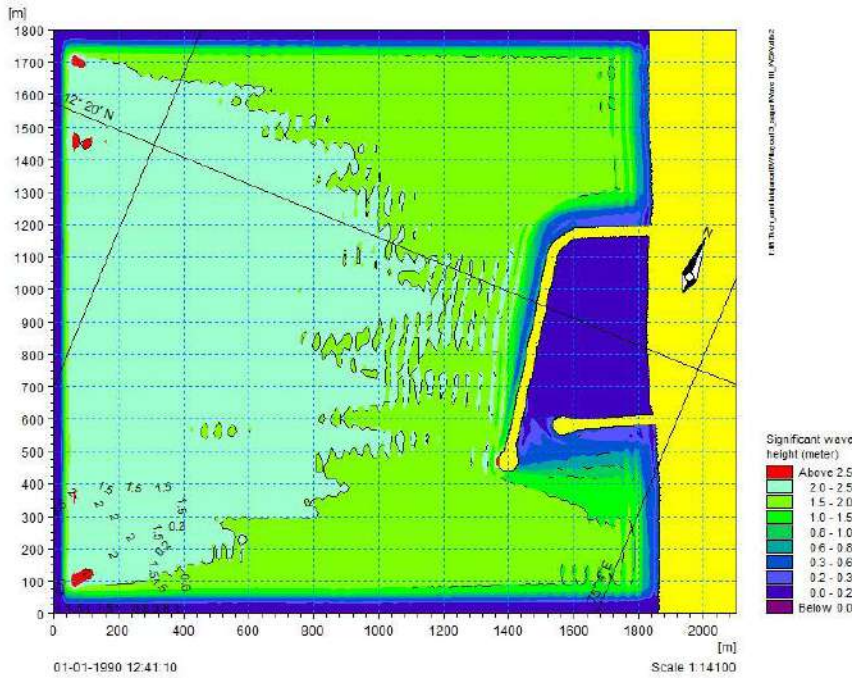


Figure 45. Wave Height Distribution Plot
Wave Direction - WSW, Wave Height - 2.5 m

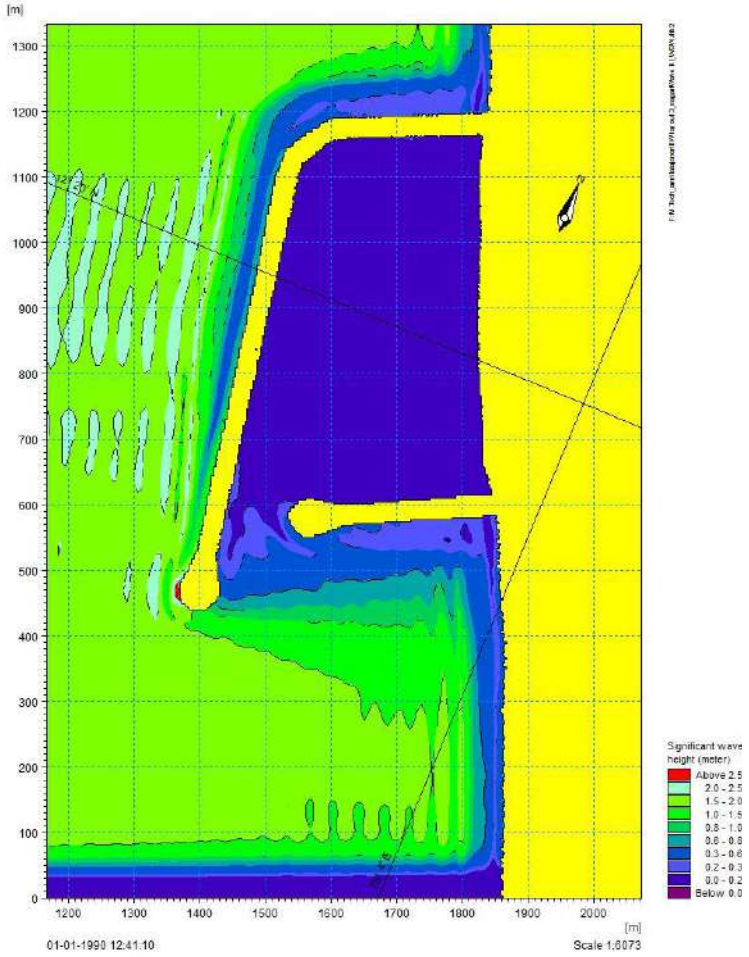


Figure 46. Zoomed in view of Figure 45

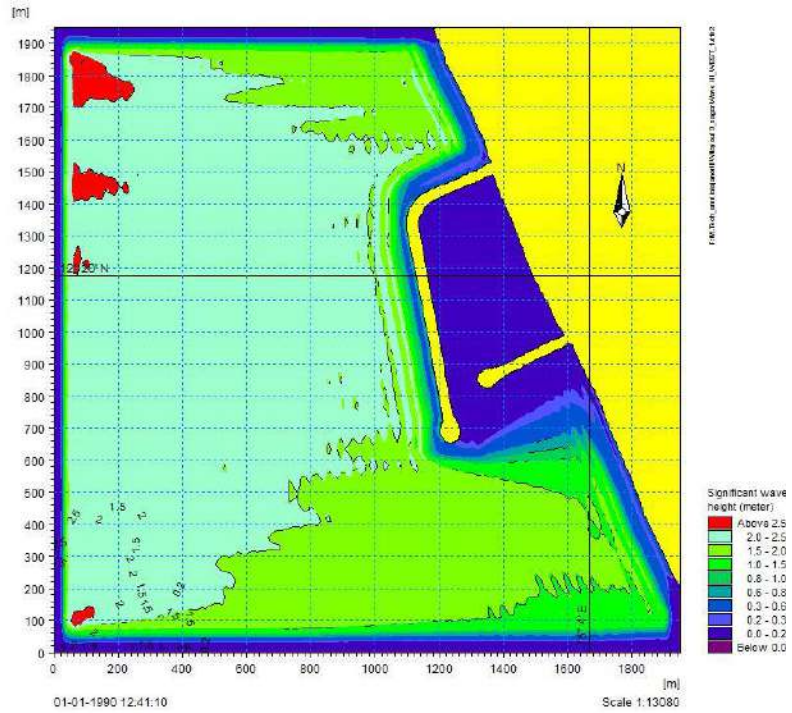


Figure 47. Wave Height Distribution Plot
Wave Direction - West, Wave Height - 2.5 m

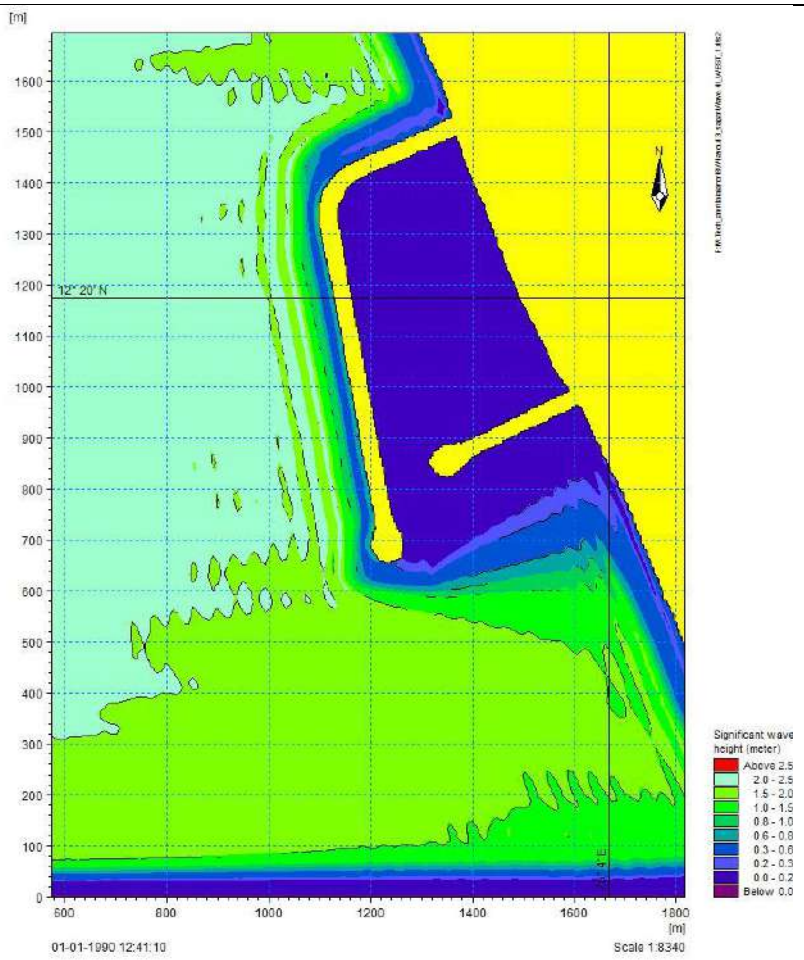


Figure 48. Zoomed in view of Figure 47

9.7 Results of Layout 3

Initially the model was operated for the incident wave height of 1.5 m from SSW direction. The Bathymetry for the simulation and surface elevation and wave distribution obtained by the model are shown in Figure 39, Figure 40, Figure 41 & Figure 42 respectively. From these Figures and the Table 15 it could be seen that the wave heights in the southern portion is in the range of 0.30 – 0.55 m with the average of 0.35 m. An area of only 1.09% is having waves more than tranquility limit of more than 0.3 m. It can be stated that the whole harbour is tranquil.

Next, the model was operated for the incident wave height of 2.0 m from SW direction. Since the bathymetry for Layout 3 is going to be the same for all the direction runs, bathymetry for SSW as representative only has been given and bathymetry for other directions has not been reproduced. Surface water elevation plot is the representative of wave propagation therefore only one sample plot has been given for SSW direction. Wave height distribution plot for SW is given in Figure 43 & Figure 44. From these Figures and the Table 15 could be seen that the wave heights in the southern area is in the range of 0.30 – 61 m with the average of 0.37 m. An area of about less than 1% is having waves more than tranquility limit of more than 0.3 m. All most the whole harbour is tranquil.

Then, the model was operated for the incident wave height of 2.5 m and direction WSW. Wave height distribution plot for WSW is given in Figure 45 & Figure 46. From these Figures and the Table 15 it could be seen that the wave heights in the Northern area are in the range of 0.30 – 0.39 m with the average of 0.32 m. An area of about less than 1% is having waves more than tranquility limit of more than 0.3 m. All most the whole harbour is tranquil.

Then, the model was operated for the incident wave height of 2.5 m and direction West. Wave height distribution plot for WSW is given in Figure 47 & Figure 48. From these Figures and the Table 15 it could be seen that the wave heights at the entrance are in the range of 0.30 – 0.39 m with the average of 0.32 m. An area of about less than 1% is having waves more than tranquility limit of more than 0.3 m. All most the whole harbour is tranquil.

Table 15 : Wave Heights in the harbour for the input wave conditions (Layout 3)

Wave Direction	Wave Height (m)	Area (%) having more than 0.3 m wave height	Average wave height in the area given in col. 3 (m)	Highest wave height in the harbour (m)
SSW	1.5	1.09	0.35	0.55
SW	2.0	0.10	0.31	0.38
WSW	2.5	0.08	0.37	0.61
West	2.5	0.08	0.32	0.39
WNW	*	*	*	*

** Since the harbour is tranquil for other critical wave directions, it will remain tranquil for this WNW direction also. Due to this reason WNW wave direction was not studied for this layout.*

9.8 Bathymetry, Surface Water Level and Wave Height Distribution plot for Layout 4

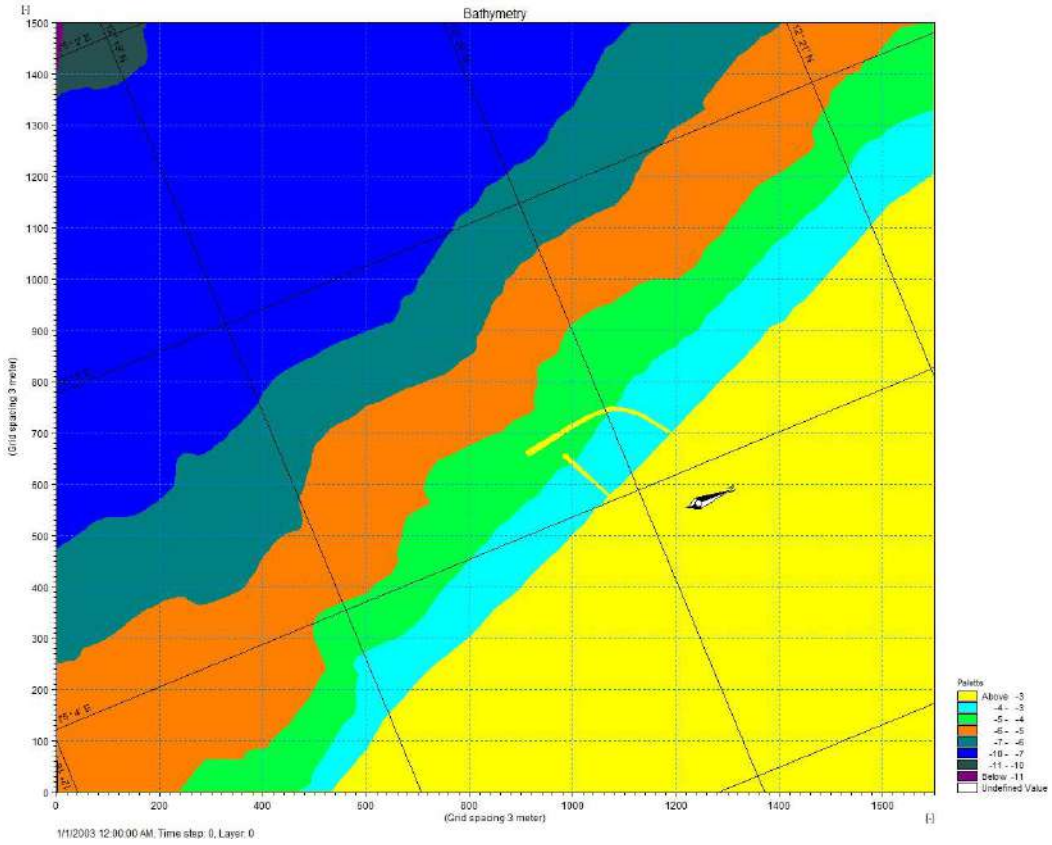


Figure 49. Sample Bathymetry Plot for Layout 4

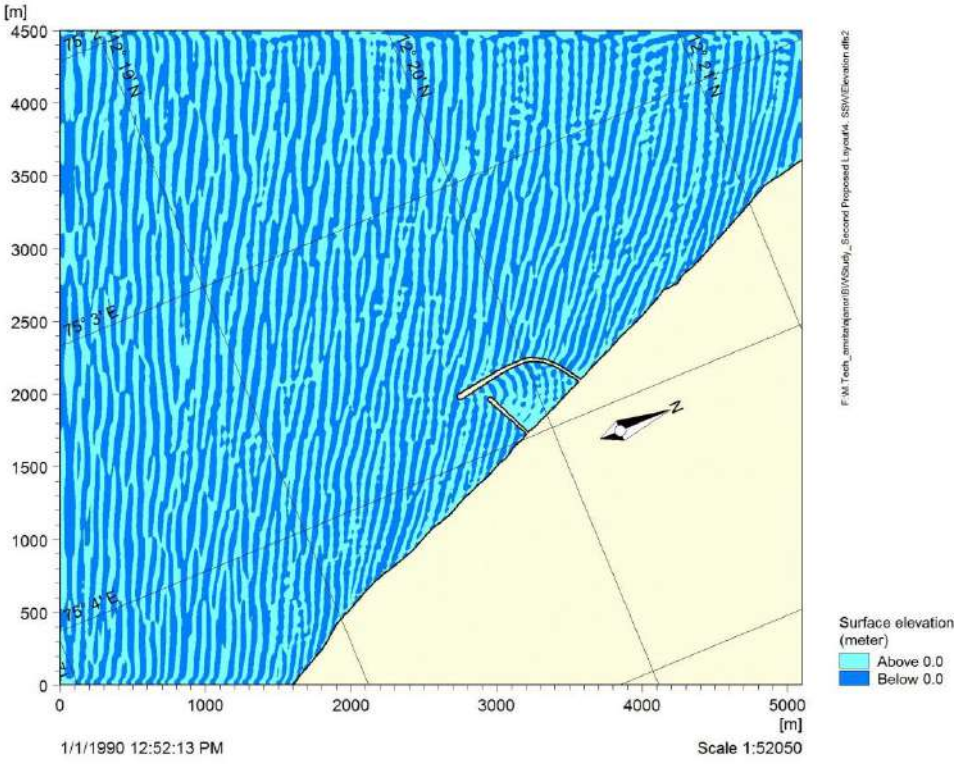


Figure 50. Sample Surface Water Distribution Plot for Layout 4

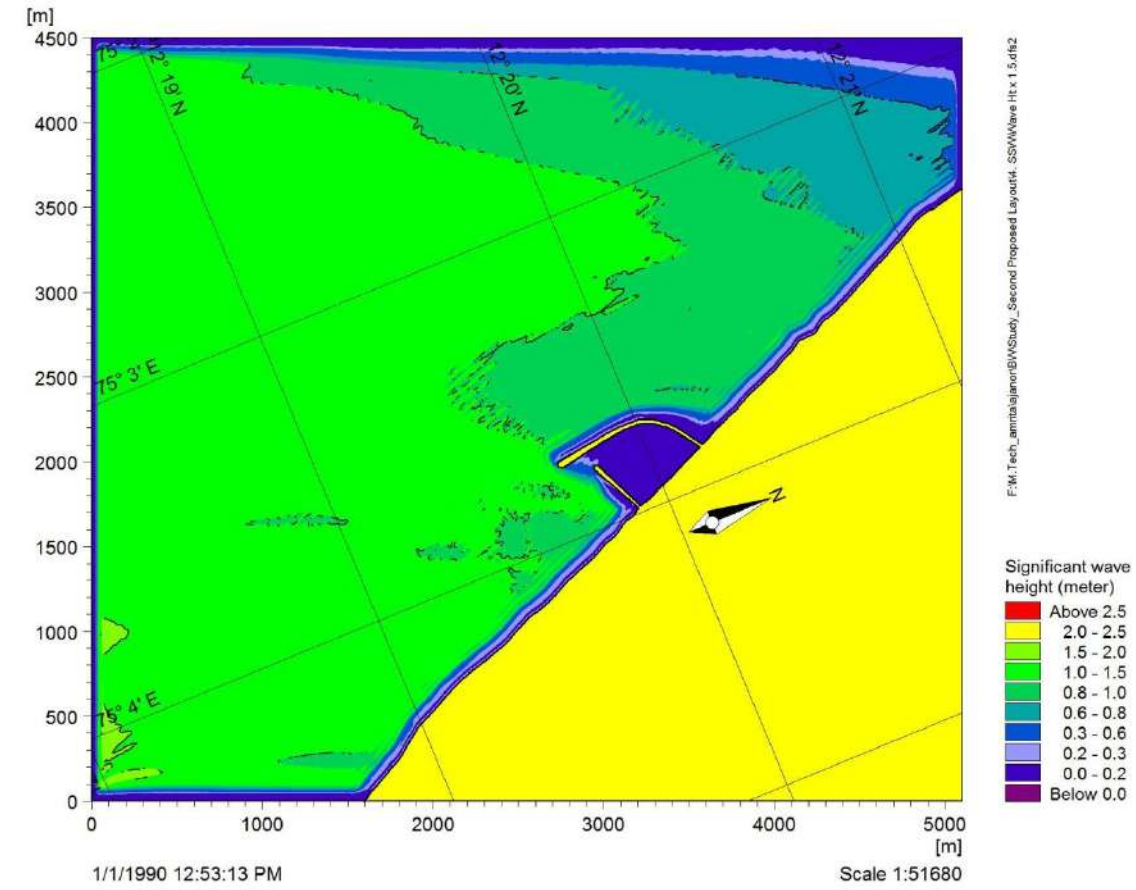


Figure 51. Wave Height Distribution Plot
Wave Direction - SSW, Wave Height - 1.5 m

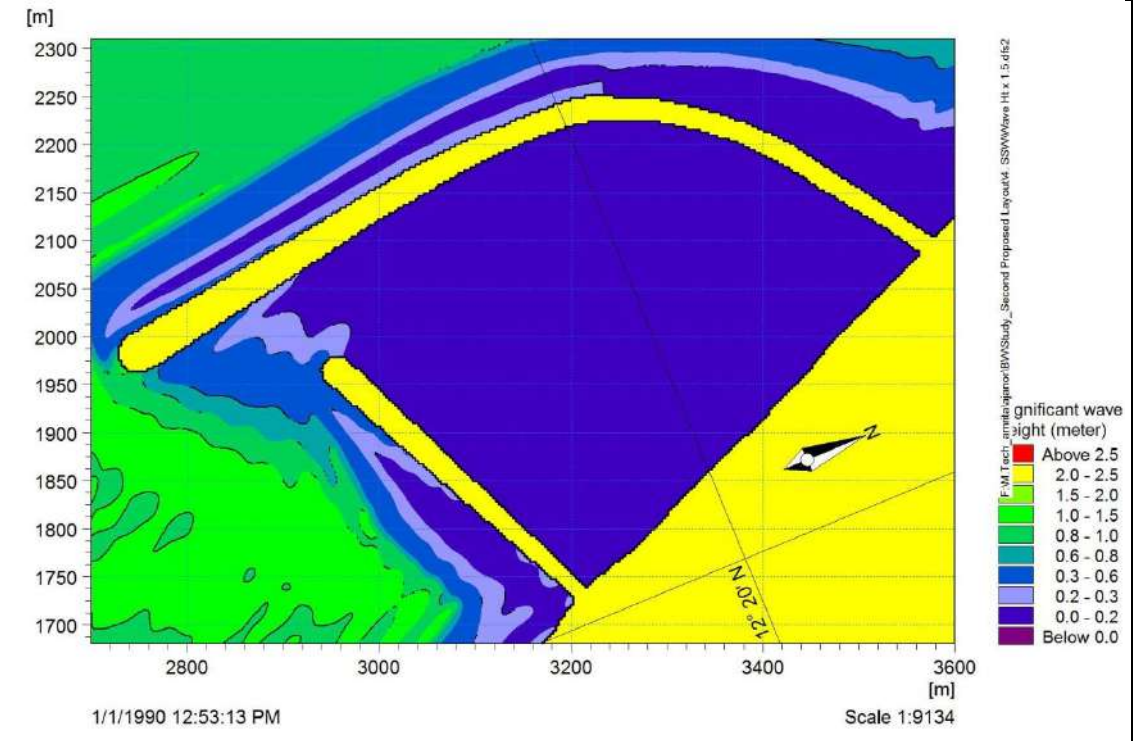


Figure 52. Zoomed in view of Figure 51

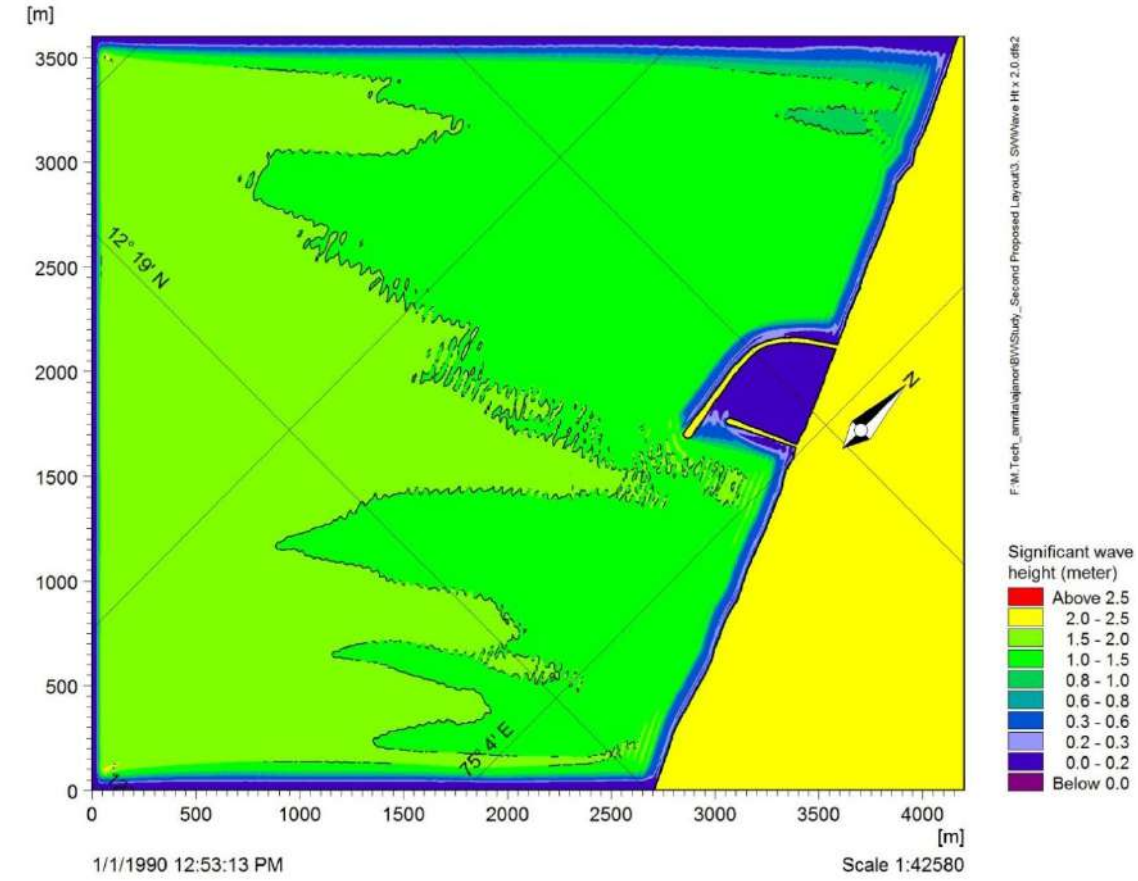


Figure 53. Wave Height Distribution Plot
Wave Direction - SW, Wave Height - 2.0 m

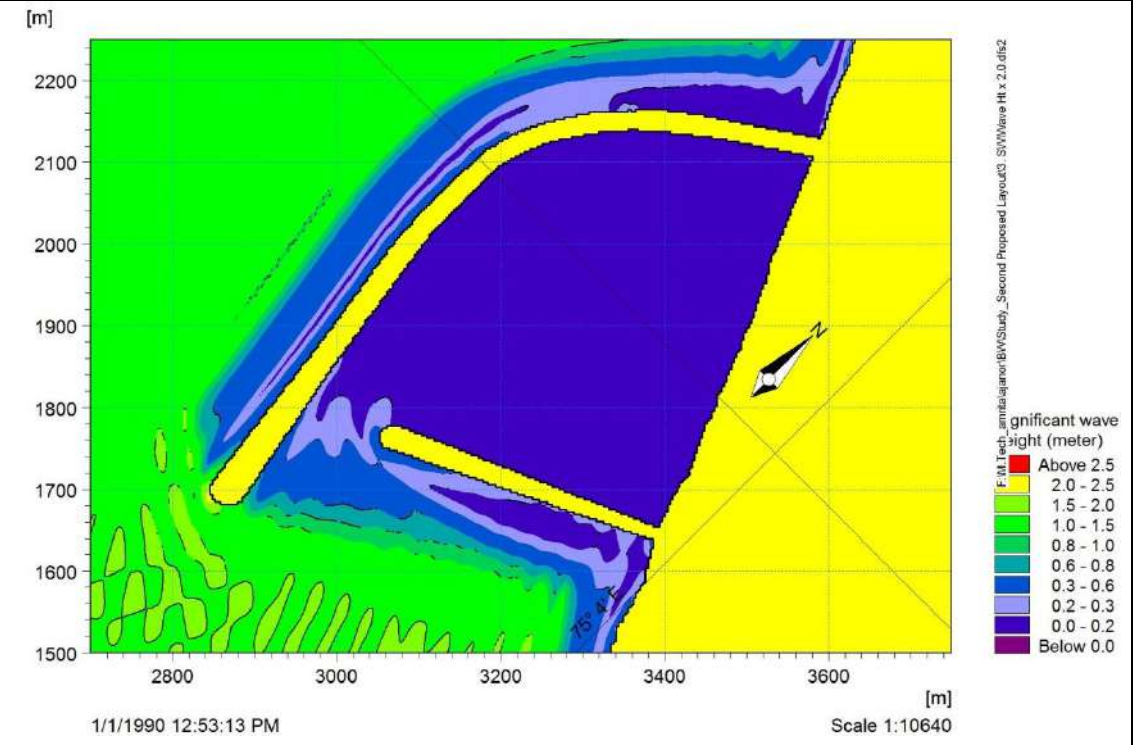


Figure 54. Zoomed in view of Figure 53

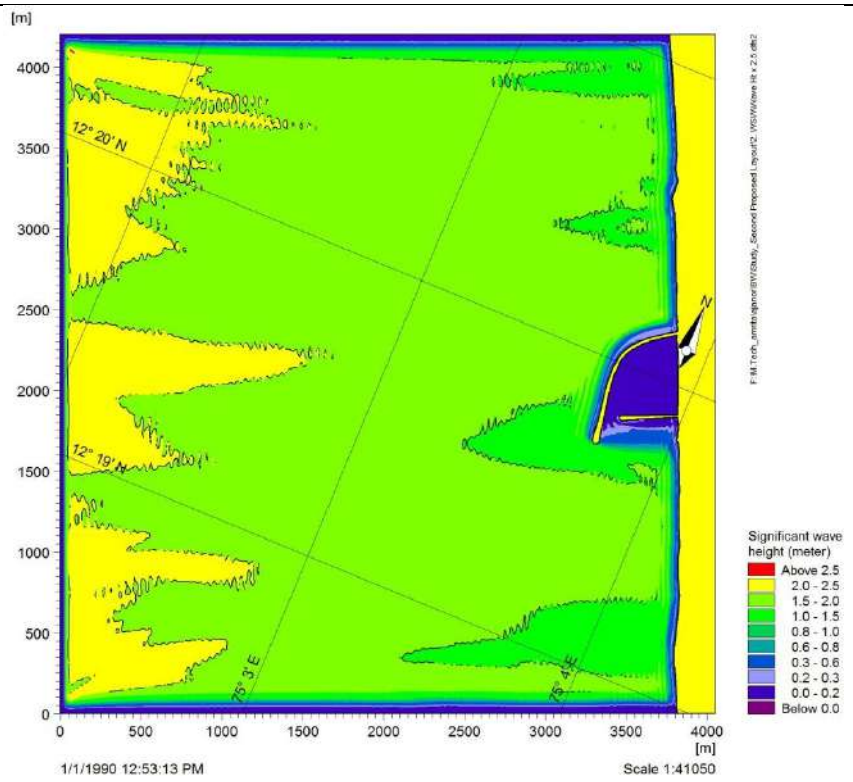


Figure 55. Wave Height Distribution Plot
Wave Direction - WSW, Wave Height - 2.5 m

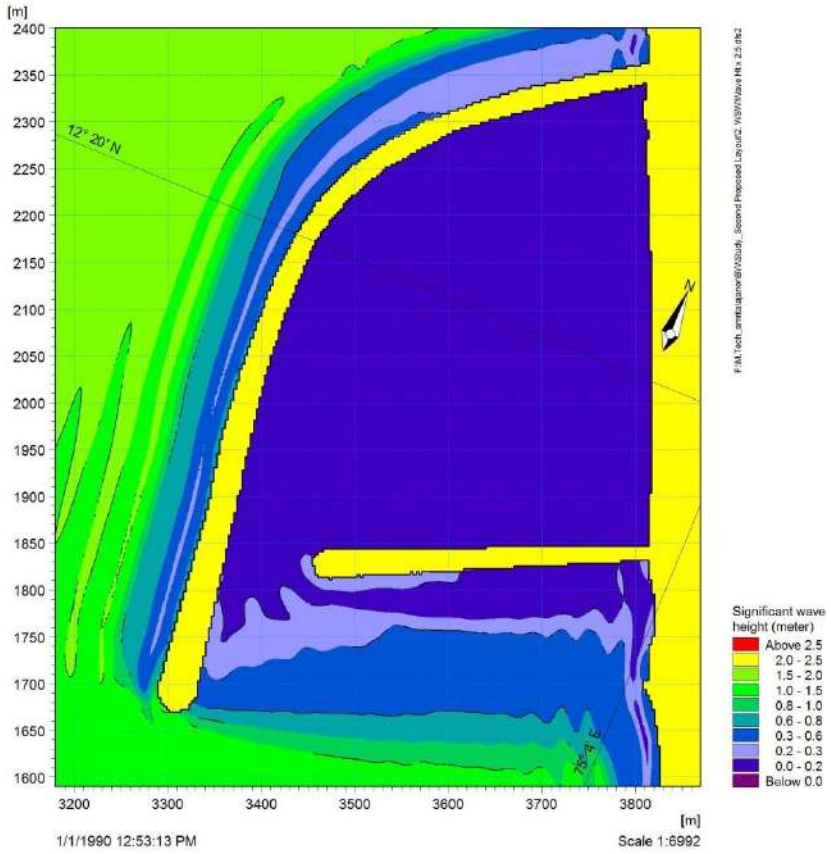


Figure 56. Zoomed in view of Figure 55

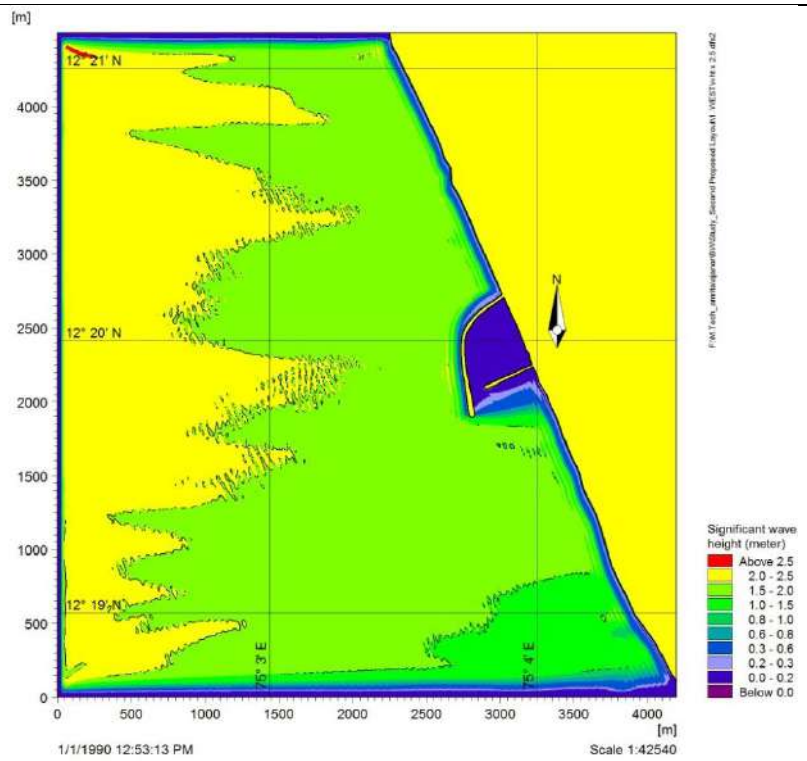


Figure 57. Wave Height Distribution Plot
Wave Direction - West, Wave Height - 2.5 m

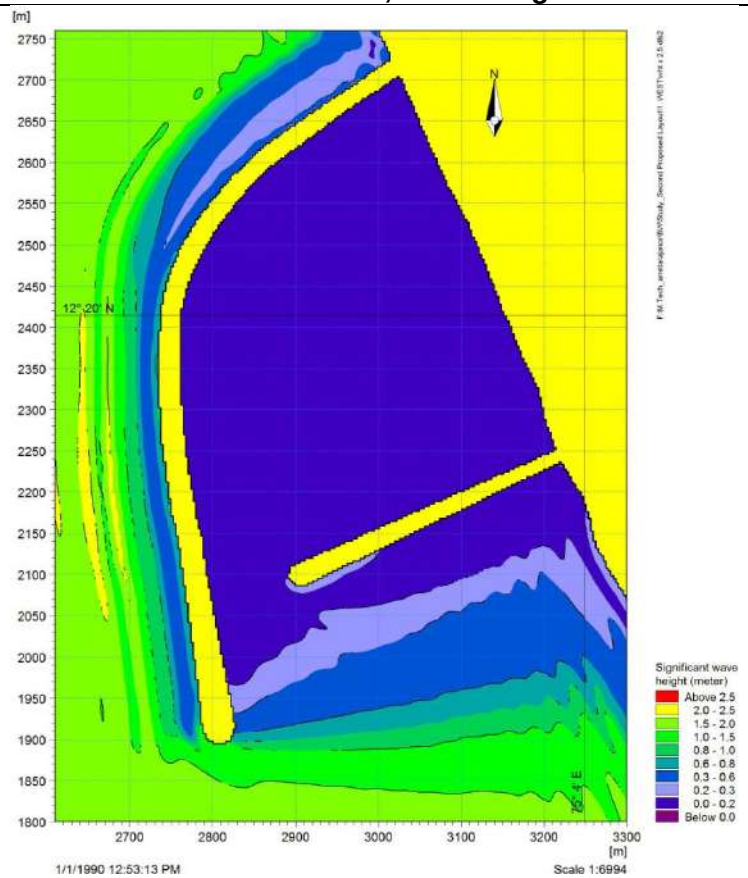


Figure 58. Zoomed in view of Figure 57

9.9 Results of Layout 4

Initially the model was operated for the incident wave height of 1.5 m from SSW direction. The Bathymetry for the simulation, surface elevation and wave distribution obtained by the model are shown in Figure 49, Figure 50, Figure 51 & Figure 52 respectively. From these Figures and the Table 10, it could be seen that the wave heights inside the entire harbour is in the range of 0.09 – 0.37 m with the average of 0.06 m. An area of only 0.04% is having waves more than tranquility limit of more than 0.3 m. It can be stated that the whole harbour is tranquil.

Next, the model was operated for the incident wave height of 2.0 m from SW direction. Since the bathymetry for layout-4 is going to be the same for all the direction runs, bathymetry for SSW as representative only has been given and bathymetry for other directions has not been reproduced. Surface water elevation plot is the representative of wave propagation therefore only one sample plot has been given for SSW direction. Wave height distribution plot for SW is given in Figure 53 & Figure 54. From these Figures and the Table 10, it could be seen that the wave heights inside the entire harbour area is in the range of 0.10-0.40 m with the average of 0.07 m. An area of about 0.12% is having waves more than tranquility limit of more than 0.3 m. All most the whole harbour is tranquil.

Then, the model was operated for the incident wave height of 2.5 m and direction WSW. Wave height distribution plot for WSW is given in Figure 55 & Figure 56. From these Figures and the Table 10, it could be seen that the wave heights in the entire harbour area are in the range of 0.06-0.28 m with the average of 0.09 m. No area inside the harbour is having waves more than tranquility limit of more than 0.3 m, thus, harbour is tranquil.

Then, the model was operated for the incident wave height of 2.5 m and direction west. Wave height distribution plot for West is given in Figure 57 & Figure 58. From these Figures and the Table 10, it could be seen that the wave heights in the entire are in the range of 0.07-0.25 m with the average of 0.09 m. Therefore, it can be stated that the entire harbour area is tranquil as the waves more than tranquility limit of more than 0.3 m are not observed.

Table 16 : Wave Heights in the harbour for the input wave conditions (Layout 4)

Wave Direction	Wave Height (m)	Area (%) having more than 0.3 m wave height	Average wave height in the area given in col. 3 (m)	Highest wave height in the harbour (m)
SSW	1.5	0.04	0.06	0.37
SW	2.0	0.12	0.07	0.40
WSW	2.5	NIL	0.09	0.28
West	2.5	NIL	0.09	0.25
WNW	*	*	*	*

**Since the harbour is tranquil for other critical wave directions, it will remain tranquil for this WNW direction also. Due to this reason WNW wave direction was also not studied for this layout.*

Gist of wave heights inside the harbour, height wave height average wave height in the higher wave height area zone for all the three layouts is given in the **Table 17** below.

Table 17 : Wave Height, Average wave Height and Maximum wave heights of all the three layouts

Layout	Wave Direction	Wave Height (m)	Area (%) having more than 0.3 m wave height	Average wave height in the area given in col. 4 (m)	Highest wave height in the harbour (m)	Remarks
Column No1	2	3	4	5	6	7
Layout 1	SSW	1.5	19.95	0.58	1.41	
	SW	2.0	28.68	0.69	1.57	
	WSW	2.5	48.04	1.02	2.52	
	West	2.5	62.21	0.84	2.51	
	WNW	1.5	41.28	0.50	1.13	
Layout 2	SSW	1.50	38.01	0.52	1.20	
	SW	2.0	55.31	0.68	1.52	
	WSW	2.5	51.64	0.98	2.28	
	West	2.5	92.69	0.93	3.99	
	WNW	1.5	23.41	0.58	1.13	
Layout 3	SSW	1.5	1.09	0.35	0.55	
	SW	2.0	0.10	0.31	0.38	
	WSW	2.5	0.08	0.37	0.61	
	West	2.5	0.08	0.32	0.39	

Layout	Wave Direction	Wave Height (m)	Area (%) having more than 0.3 m wave height	Average wave height in the area given in col. 4 (m)	Highest wave height in the harbour (m)	Remarks
	WNW	-	-	-	-	
Layout 4	SSW	1.5	0.04	0.06	0.37	
	SW	2.0	0.12	0.07	0.40	
	WSW	2.5	0.0	0.09	0.28	
	West	2.5	0.0	0.09	0.25	
	WNW	*	*	*	*	

**Since the harbour is tranquil for other critical wave directions, it will remain tranquil for this WNW direction also. Due to this reason WNW wave direction was also not studied for this layout.*

10. DISCUSSION OF RESULTS

Wave tranquility study of all the four proposed layouts have indicated that Layout 1 will have 164 days as non operational days in a year when waves are likely to exceed 0.3 m. Similarly Layout 2 is also having 157 days as non operational days. Layout 3 & 4 shall remain operational from wave tranquility point of view throughout the year. Project authority may decide the feasibility among the Layout 3 and Layout 4 based on the economy. However vessels may face some difficulty while entering to the harbour as they have to sail for a short distance along the waves i.e. broadside waves in both cases. Littoral drift studies carried out at CWPRS (T.R. No. 5357 of February 2016) have also indicated that southward drift is predominant.

Table 18 : Number of Safe operational Days in a year

Layout	Layout--1	Layout-2	Layout-3	Layout-4
Number of operational days	201 days in the southern harbour	208 days in the northern harbour	365 days in the harbour	365 days in the harbour

11. CONCLUSIONS

- The percentage occurrence of wave distribution Table 8 at 10m depth near Ajanur for January to December shows that , the predominant wave directions are SSW, SW , WSW , West , and WNW with the percentage occurrence of 8.55, 5.35, 8.56, 23.72 and 16.78 respectively. The maximum wave height of 3.0 m from West direction is observed.
- The input wave conditions for the wave tranquility studies are derived as follows for input to the MIKE21BW model for study of with Layout 1, Layout 2, Layout 3 and Layout 4.

Incident Wave Direction	Incident Wave Height
SSW	1.5
SW	2.0
WSW	2.5
WEST	2.5
WNW	1.5

- The wave tranquility studies with Layout 1 indicated that the berthing operations have to be planned in the southern area. The wave heights from WSW, West and WNW are creating more disturbances in the entrance area. Safe berthing operation is possible for about 201 days in a year.
- The wave tranquility studies with Layout 2 indicated that the berthing operations have to be planned in the northern area. Safe berthing operation is possible for about 208 days in a year
- With Layout 3 and Layout 4 there is a considerable improvement in the wave heights inside the harbour basin. The wave heights are always less than the wave tranquility limit of 0.3m. With these Layouts the harbour will be operational from wave tranquility point of view throughout the year. Project authority may decide the feasibility among the Layout 3 and Layout 4 based on the economy. However vessels may face some difficulty while entering to the harbour as they have to sail for a short distance along the waves i.e. broadside waves. Littoral drift studies done at CWPRS (T.R. No. 5357 of February 2016) has also indicated that southward drift is predominant,
- The above statistics is based on the ship observed visual wave data. These data are observed through ships. During stormy conditions ship try to avoid storm track, therefore these data do not contains storm data. Therefore non operational days shall be taken without storm and storms shall add to the non operational days.

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MINISTRY OF WATER RESOURCES,
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MATHEMATICAL MODELLING IN COASTAL ENGINEERING

Technical Report No.5357
February 2016

MATHEMATICAL MODEL STUDIES FOR LITTORAL DRIFT AND SHORELINE EVOLUTION DUE TO THE PROPOSED FISHERY HARBOUR AT AJANUR, DIST. KASARGOD, KERALA

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2(D)	Percentage occurrence of wave height & direction at Ajanur during entire period (Jan-Dec)	15

REPORT DOCUMENTATION SHEET

Technical Report No.5357 **February 2016**

Title: MATHEMATICAL MODEL STUDIES FOR LITTORAL DRIFT AND SHORELINE EVOLUTION DUE TO THE PROPOSED FISHERY HARBOUR AT AJANUR, DIST. KASARGOD, KERALA

Officers Responsible for Conducting the Studies

Shri J Sinha, Scientist D and Shri S N Jha, Assistant Research Officers carried out the studies under the overall guidance of Shri M D Kudale, Additional Director.

Name and Address of the Organization Conducting the Studies

Mathematical Modelling in Coastal Engineering
Central Water and Power Research Station
Pune 411 024, India

Name and Address of the Authority Sponsoring the Studies
Chief Engineer, Harbour Engineering Department,
Kamaleswaram, Manacaud-P.O.,
Thiruvananthapuram-695009.

Synopsis

Ajanur is one of the prominent fishing villages of Kasargod district with extensive fishing activity. The project site is situated near the estuary of Chithari backwaters in Kasargod taluka. The site is easily accessible from major roads through a network of coastal roads. The site is located about 18.0 km north-west of Cheruvatur fishery harbour and about 26.0 km south-east of Kasargod fishing harbour. In order to establish a fishery harbour at Ajanur for the development of the region which in turn beneficial to all the sections of fishermen communities, mathematical model studies have been referred to CWPRS to access littoral drift distribution and changes in shoreline at the proposed location of the fishing harbour.

Mathematical model studies, using MIKE 21 SW and LITPACK, have been carried out to access littoral drift distribution and changes in shoreline at the proposed location of the fishing harbour. Based on the model studies it is inferred that the annual southward and northward transports are of the order of 0.531 million cum and 0.118 million cum respectively with the net and the gross transports being 0.413 million cum and 0.649 million cum respectively. The net longshore transport is towards south and occurs majorly during SW monsoon. Distribution of longshore sediment transport further shows that it is confined within a range of 500 m from the shoreline. The peak transport occurs at about 50 m from the shoreline and about 75% transport occurs in the range of 50 m to 150 m from shoreline i.e. between +0.0 m to –3.5 m depth contours. In 10 years period, accretion on the northern side of the proposed northern breakwater would be expected upto about 68 m in cross-shore direction, which is likely to be extended upto 2500 m in longshore direction towards north. Further, in the same period of time, the erosion on the southern side of the proposed southern breakwater would be expected upto 40 m in cross-shore direction, which is likely to be extended upto about 1500 m in longshore direction towards south.

KEY WORDS: Mathematical model, LITPACK, Wave, Littoral Drift, MIKE 21 SW, Shoreline Changes, Wave transformation

ഭരണഭാഷ-മാതൃഭാഷ

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സ്വീകർത്താവ്
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മത്സ്യബന്ധനതുറമുഖ (ബി) വകുപ്പ്
തിരുവനന്തപുരം

സർ,

വിഷയം:- ഹാർബർ എഞ്ചിനീയറിംഗ് വകുപ്പ്- PMMSY- Construction of Ajanur Fishing Harbour in Kasargod District- റിവൈസ് ചെയ്ത വിശദമായ പദ്ധതിരൂപരേഖ സമർപ്പിക്കുന്നത് – സംബന്ധിച്ച്.

സൂചന:- 1) ഈ കാര്യാലയത്തിൽ നിന്നും ഫിഷറീസ് ഡയറക്ടർക്ക് നൽകിയ 03.03.2022 ലെ ഇതേ നമ്പർ കത്ത്
2) സർക്കാർ കത്ത് നമ്പർ B1/240/2021- F and PD തിയതി 24.03.2022

സൂചനയിലേക്ക് സർക്കാരിന്റെ ശ്രദ്ധ ക്ഷണിക്കുന്നു. കാസർഗോഡ് ജില്ലയിലെ അജാനൂർ മത്സ്യബന്ധന തുറമുഖ നിർമ്മാണത്തിനായുള്ള 101.33 കോടി രൂപയുടെ വിശദമായ പദ്ധതി രൂപരേഖ PMMSY സ്കീമിൽ ഉൾപ്പെടുത്തി അംഗീകാരം ലഭ്യമാക്കുന്നതിനായി സൂചന (1) പ്രകാരം സമർപ്പിച്ചിരുന്നു. 24/03/2022 ൽ നടന്ന State Level Approval and Monitoring Committee (SLAMC) മീറ്റിംഗിൽ പ്രസ്തുത പദ്ധതി രൂപരേഖ അംഗീകരിക്കുകയും ആയതു സൂചന (2) പ്രകാരം കേന്ദ്ര സർക്കാരിന് അംഗീകാരത്തിനായി സമർപ്പിക്കുകയും ചെയ്തു. തുടർന്ന് 27/03/2022 തിയ്യതിയിൽ നടന്ന കേന്ദ്ര സർക്കാരിന്റെ പ്രോജക്ട് അപ്പ്രൈസൽ കമ്മിറ്റിയിൽ മേൽ പദ്ധതി പരിഗണിക്കുകയും ഭാവി വികസനം കൂടി കണക്കിലെടുത്ത ബേസിൻ ഏരിയ വലുതാക്കി പദ്ധതി രൂപരേഖ പുതുക്കി സമർപ്പിക്കുന്നതിന് നിർദ്ദേശിക്കുകയും ചെയ്തു.

കമ്മിറ്റിയുടെ നിർദ്ദേശം അനുസരിച്ച് വീണ്ടും പൂർണ്ണ തോതിലുള്ള ഒരു മാതൃകാ പഠനം CWPRS മുഖേന നടത്തി അന്തിമ റിപ്പോർട്ട് ലഭിച്ചതിന്റെ അടിസ്ഥാനത്തിൽ പദ്ധതിക്കായുള്ള ഒരു പുതുക്കിയ DPR വകുപ്പ് തയ്യാറാക്കിയിട്ടുണ്ട്. പുതുക്കിയ പദ്ധതി രൂപരേഖ പ്രകാരം പദ്ധതി തുക 200 കോടി രൂപ വരുന്നുണ്ട്. മേൽ പദ്ധതി രൂപരേഖ അംഗീകാരത്തിനായി ഇതോടൊപ്പം സമർപ്പിക്കുന്നു. ഈ അവസരത്തിൽ താഴെ പറയുന്ന കാര്യങ്ങളിൽ കൂടി സർക്കാരിന്റെ ശ്രദ്ധ ക്ഷണിക്കുന്നു.

ഇപ്പോൾ തയ്യാറാക്കിയിരിക്കുന്ന പദ്ധതി രൂപരേഖയിൽ മത്സ്യബന്ധന തുറമുഖം, പുഴയുടെ അഴിമുഖം മണ്ണടിയാതിരിക്കുവാനുള്ള TRAINING WALL, FLUME STUDY അടിസ്ഥാനമാക്കിയ പുലിമുട്ടുകളുടെ ഡിസൈൻ, മുതലപ്പൊഴി പദ്ധതിക്കായി DPR സമർപ്പിക്കുന്ന വേളയിൽ കേന്ദ്രസർക്കാർ നിർദ്ദേശിച്ച ഗ്രീൻ ആൻഡ് സ്മാർട്ട് ഘടകങ്ങൾ എന്നിവ ഉൾക്കൊണ്ടിരിക്കുന്നു. മോഡൽ സ്റ്റഡി റിപ്പോർട്ട് പ്രകാരം ഹാർബറിന്റെ ഇരു വശങ്ങളിലും sea wall നിർമിക്കുന്നതിന് ശുപാർശ ചെയ്തിരുന്നു. seawall നിർമിക്കുന്നതിന് ഏകദേശം 30 കോടി രൂപ estimate തുക വരും. ടി തുക കൂടി ഉൾപ്പെടുത്തുമ്പോൾ പദ്ധതി തുക 230 കോടി രൂപ വരുന്നുണ്ട്. PMMSY പദ്ധതികളുടെ unit cost 200 കോടി രൂപ ആയതിനാൽ seawall നിർമാണം ഒഴിവാക്കിയാണ് പദ്ധതി രൂപരേഖ തയ്യാറാക്കിയിരിക്കുന്നത്. മത്സ്യബന്ധന തുറമുഖത്തിന്റെ നിർമാണത്തിനു ശേഷം തീരത്തുള്ള വ്യതിയാനം നിരീക്ഷിച്ച ശേഷം seawall നിർമാണം നടപ്പിലാക്കുന്നതായിരിക്കും ഉചിതം എന്ന് CWPRS അഭിപ്രായപ്പെട്ടിരുന്നു.

പ്രസ്തുത പദ്ധതി രൂപരേഖ PMMSY പദ്ധതിയിൽ ഉൾപ്പെടുത്തി അംഗീകാരം ലഭ്യമാക്കുന്നതിനുള്ള നടപടികൾ സ്വീകരിക്കണമെന്ന് അഭ്യർത്ഥിക്കുന്നു. പദ്ധതിക്ക് CRZ അനുമതി ലഭിക്കുന്നതിനാവശ്യമായ CRZ STATUS REPORT, EIA STUDY REPORT എന്നിവ താമസിയാതെ ലഭ്യമാക്കുമെന്ന് ബന്ധപ്പെട്ട ഏജൻസികൾ അറിയിച്ചിട്ടുണ്ട്.

വിശ്വസ്തതയോടെ,

Signed by
ചീഫ് എഞ്ചിനീയർ
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Date: 17-10-2024 19:01:03

ഉള്ളടക്കം - വിശദമായ പദ്ധതിരൂപരേഖ

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ഇത് കംപ്യൂട്ടർ ജനറേറ്റ് ചെയ്ത പ്രമാണമാകയാൽ മാനുവൽ ഒപ്പ് ആവശ്യമില്ല

GOVERNMENT OF KERALA

Harbour Engineering Department



CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DETAILED PROJECT REPORT

PRADHAN MANTRI MATSYA SAMPADA YOJANA

OCTOBER 2024

SYNOPSIS

Ajanur is a fishing village situated near ChithariRiver with an urban catchment of high population density. The river is to the north of Kanhangad Town in Kasaragod District. This area is a well-known fishing area in Kasaragod District and a number of fishing crafts operate from this area. Both the fishermen and the fishery industry of the region are persistently demanding for further development of the area. In addition to the demand for construction of a new fishing harbour, there have been persistent demands to make the Chithaririver mouth permanent and prevent the formation of the sand bars at the mouth.

The mouth of Chithari River is of migratory nature and often gets completely closed in summer seasons. The closing of the river mouth causes flash floods at the coastal areas where the estuary out falls in to the sea. People living on the upstream side of river face disaster due to this.The condition gets aggravated as the catchment or the storm drainage area of the river is densely populated urban area. The discharge from the river is not sufficient to flush out the sand bars created by coastal marine morphology, hence man made efforts are required on an annual basis to open the river mouth before monsoons. Another problem is the migratory nature of the river mouth, which moved far south in the last few years causing damages to the auction halls and other infrastructure created for fishery at the site.

Harbour Engineering Department entrusted Mathematical Model Studies to Central Water Power Research Station (CWPRS, Pune) for establishing a fishing harbor and for training work of ChithariRiver. The layout of breakwaters for construction of an open sea fishing harbor is based on this model study.

This detailed project report is prepared for the construction of an open sea fishing harbour and river training work along with other infrastructures at Ajanur in Kasaragod District in Kerala State under PMMSY. The master plan includes construction of north and south breakwaters, training wall on the north side based on CWPRS recommendations, wharf and auction hall, dredging and reclamation, berthing wharf, canteen, net mending shed, shop rooms, locker rooms, gate and gate house, office cum surveillance room, ETPetc .The estimated project cost including all the components is **20000lakh**The estimate is prepared using Kerala Government PRICE software, which is based on the DSR 2018 rates with current cost index for Kasaragod District (33.05%).

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Annexures **Ajanur Fishing Harbour – Calculation of wharf length, Cost Benefit Analysis, Soil Investigation Report, Mathematical Model Study Reports, Estimates, Drawings**

1. PROJECT SUMMARY

1.	Title of the project	Construction of Ajanur Fishing Harbour
2.	District	Kasaragod
	Taluk	Kasaragod
	Corporation/Municipality/Panchayath	AjanurGramaPanchayath
	Assembly Constituency	Kanhangad LAC
3.	Implementing agency	Harbour Engineering Department
4.	DPR prepared by	Harbour Engineering Department
5.	Project outlay	Rs. 20000 lakhs
6.	Nature of the project	Construction of new Fishing harbour
7.	Present status of existing Fisheries Infrastructure	Fish landing Centre
8.	Need for the project (Brief)	• Providing a safe harbour for the artisanal fishing operations in Kasargode District. • To improve the hygiene standards in post-harvest operations and ensure better product quality satisfying EEC/HACCP norms. • To promote responsible fishing practices as envisaged by FAO. • Providing training works for Chithari River to keep the estuary open and prevent inundation.
9.	Total estimated cost and item wise cost break up	Project Abstract of Estimate (Attached as Annexure)
	Whether detailed estimate attached?	Yes (Attached as Annexure)
10.	Details of revenue streams	User charges, Lease of rights
11.	Details of project risks	• Availability of Construction materials Availability of Labourers • Quarrying restrictions • Fund flow • Climate changes

12.	Details of project management organisation strategy	• Estimation, Technical Sanctions, Tendering and Agreement Execution will be done by Harbour Engineering Department • PRICE software is the tool for preparing, scrutinizing and transmitting the estimates. • Tendering will be done by inviting online e-tenders from pre-qualified contractors. • MS Project is the tool used for scheduling the projects. • Work Execution and preparation of Bills will be done by Harbour Engineering Department.
13.	Details of contract management strategy	• The Public Works manual of state government specifies the duties, responsibilities and delegated powers of officers in contract management. It also specifies fines for project delays and incentives for early completion. • HED will invite tenders, execute agreement and supervise the work.
14.	Details of Project Implementation Schedule (PIS) & Work Breakdown Schedule (WBS) Proposed duration to complete the project	WBS Bar Chart.
15.	Details of statutory clearances obtained	
16.	Quality Control infrastructure and mechanism	• Three tier quality control systems will be implemented. • First tier quality control will be done by the contractor. • The second tier quality control will be done by the QC wing of HED. • For third tier QC the service of a reputed

		institution outside HED will be utilized.
17.	Details of attached drawings	• Key Map of Project Location • General Layouts • Breakwater sections • Wharf and auction hall • Gate and Gatehouse • Net Mending shed, Locker room, Canteen, Shop rooms • Compound wall and Side Protection Works • Parking Area and Internal Road • Dredging and Reclamation bund • Wharf for berthing facility
18.	Other attachments	• General abstract • Detailed estimate • Model Study Report

2. INTRODUCTION

2.1 Location and Regional Setting

2.1.1 Ajanur is one of the prominent fishing villages of Kasaragod district with extensive fishing activity. The project site is situated near the estuary of Chithari backwaters and is located inAjanur Gram Panchayath in KasaragodTaluk. Project site is located at 12.33° Latitude and 75.06° Longitude.

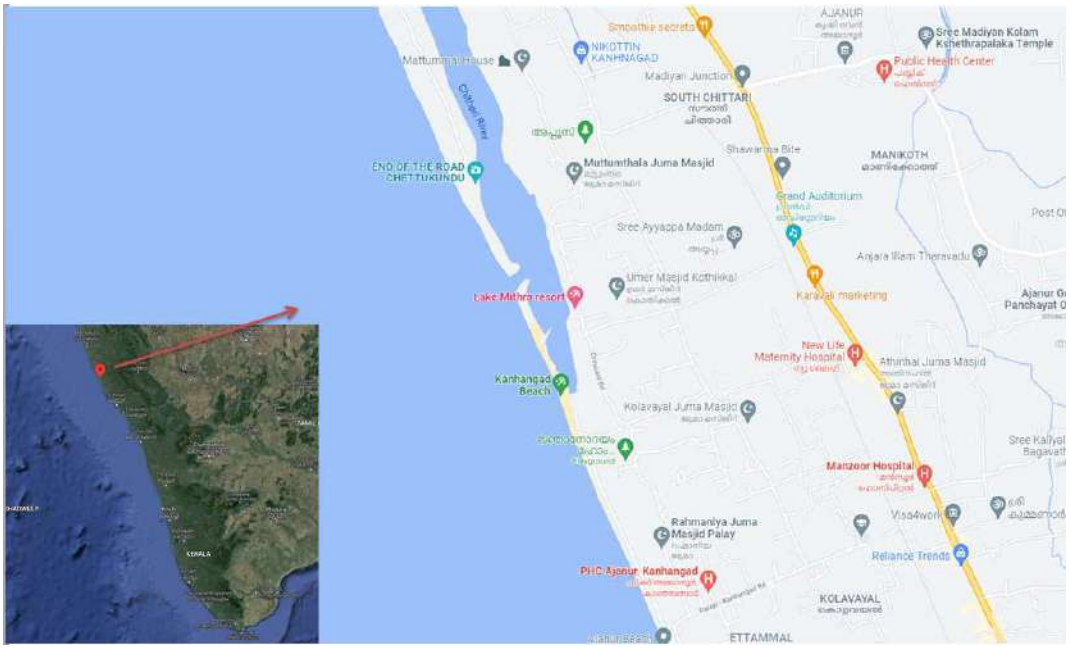


Figure 2.1 Location map of proposed fishing harbor site

2.1.2 The site is easily accessible from major roads through a network of coastal roads. The proposed project site is located 17 km north of existing Cheruvattur Fishing Harbour and 17km south of Kasargod Fishing Harbour.

2.2 Necessity of the Proposal

2.2.1 In order to meet the temporary needs of the poor fishermen of the area, a fish landing center was constructed, accessible through the Chithari River, as part of ICAD project. There is an auction hall, net mending shed and toilet block situated at the southern bank of estuary of Chithari River. But, this landing centre is not fully used by the fishermen due to the inadequate facilities.

2.2.2 Here, use of landing centre is mainly dependent on availability of shore in front of it. Sometimes, shore is eroded very close to auction hall, and any further erosion may lead to the collapse of the structure. Local fishermen demanded to have a jetty in front of it, and other additional facilities. Protection wall is also necessary to avoid soil erosion from the land. There is also demand from the fishermen of nearby area of Chitharikadappuram to construct a fish landing center for them also. All these point to the extensive fishing operation of the region. Fishing villages from Hosdurg to Pallikkara will be benefited by the project.

2.2.3 At present, the fishermen of the locality carry out their fishery activities from Chithari River. The coastal morphological changes at this river mouth are highly complex. The migration of the river mouth and the formation of sand bars have caused considerable loss of human life and land property in this area. During the onset of monsoons and when there are heavy rains in the catchments upstream, the closing of the river mouth causes extreme problems like flash floods all along the highly populated upstream area, and the people here are reportedly rehabilitated to safety each time.

2.2.4 The fishermen venturing in to the sea or coming back with the catches face extreme danger at the river mouth due to presence of sand bars. Many lives have been lost in the last few years due to this. Also the fishing vessels and engines are damaged. The river mouth needs to be manually dredged to avoid sudden flashfloods during the onset of monsoon. Often the government machinery fails to do this in time causing flood related disasters to the people living upstream. Hence there is an urgent requirement to provide necessary river training work of Chithari River to arrive at a permanent solution to the problems faced by the local population.

2.3 The Proposal

2.3.1 This proposal is put forward to construct a fishing harbour to provide necessary infrastructure facilities to cater to the needs of the locality.The mouth of Chithari River is of migratory nature and often gets completely closed in summer seasons. The discharge from the river is not sufficient to flush out the sand bars created by coastal marine morphology, hence man made efforts are required on an annual basis to open the river mouth before monsoons. Provision for training work of

Chithari River is also included in this proposal to address the issues caused by the migratory nature of the river and to keep the estuary open. Width of the channel provided is 130m which is not sufficient for the safe navigation of the vessels in rough season.Hence it is proposed to construct an open sea harbour

2.3.2 This proposal consists of provisions for construction of north breakwater of 1150m length and south breakwater of 425 m length, river training work of 435 m length,wharf, auction hall, dredging and reclamation, canteen, net mending shed, shop rooms, locker rooms, gate and gate house, etc.As per the model study report (No: 6283) shore protection measuresneeds to be provided on north and south side of the development after monitoring the shore line changes post harbour construction which is explained in the conclusion 7.0 (v and vi) as

"If the erosion on the south side of the proposed fishing harbour is progressive after the development then a suitable shore protection measure in the form of a seawall or series of groynes may be provided."

and

"If the shifting of the river mouth is pronounced after the proposed development of the river training works then a seawall of appropriate length may be provided to arrest the shifting of the river mouth."

Hence the provision for this component is not included in this DPR which may be taken up later.

2.3.3 The estimates were prepared using Kerala Government's PRICE software, which is based on the CPWD data, DSR 2018 rates and the current cost index for Kasargod District. The total cost for the proposed fishing harbour at Ajanur comes to **Rs.20000 lakh**

3. BACKGROUND INFORMATION

3.1 General

3.1.1 Kerala is blessed with a coastline of 590 km and having extensive brackish water lakes and estuaries. With a total fishermen population of more than 14 million and rich marine and inland water resources, fisheries and aquaculture forms an important sector with regard to activities in the state. Kerala occupies a premiere position in Indian fisheries by contributing about 13% of the marine landings fishing industry which has employment, livelihood, and food security of the country. The state has been a pioneer in introducing several innovative measures in harvest and post-harvest technologies in India. The technological advancements in fisheries have considerably influenced the fishing zone substantially in the last four decades with the continuous intensification of the fishing effort contributes significantly to economic, social and nutritional wellbeing of the people.

3.1.2 Fishery industries occupy an important role in the economy of Kerala. The export of fish products from Kerala worth approximately Rupees 6971 Crore, making it 12% share of India in value and 13% in quantity.

3.2 Fisheries sector in Kerala at a Glance

3.2.1 A brief outline of the fishery details of Kerala state is given below:

- 590 km Coastline
- 222 Marine and 113 Inland Fishermen Villages
- 10.54 Lakh Fishermen Population
- About 6.01 Lakh Metric Tonne Marine Fish Production
- About 15% Share in India's Total Annual Marine Fish Production

3.3 Fisheries Infrastructure in Kerala

3.3.1 Construction and commissioning of a number of fishery harbours and landing centres, introduction of new generation fishing craft and gears - both in the traditional and mechanised sectors, NCDC assisted motorisation programme for

traditional craft implemented by Matsyafed (Kerala Government undertaking), various social welfare measures taken to improve the living standards of fishermen like housing, roads, water supply schemes, fisheries schools etc, have brought considerable development to the fisheries sector of the state during the last decades. Out of the 25 fishery harbours in the state, 22 are operational and balance 3 are at various stages of construction. All harbours constructed in the state are by the Harbour Engineering Department. The detailed status of the Fishery Harbours in Kerala is given below:

Table 3.1 List of Fishing Harbours in Kerala State

No	Harbour	Nature	Location	Remarks
1	Vizhinjam	Mechanised	Thiruvananthapuram	Operational
2	Muthalapozhy	Mech. & Traditional	Thiruvananthapuram	Completed
3	Thangassery	Traditional	Kollam	Completed
4	Neendakara	Mechanised	Kollam	Completed
5	Chethi	Mech. & Traditional	Alappuzha	Work in Progress
6	Arthungal	Mech. & Traditional	Alappuzha	Work in Progress
7	Thottappally	Mechanised	Alappuzha	Completed
8	Kayamkulam	Mech. & Traditional	Alappuzha	Completed
9	Munambam	Mech. & Traditional	Ernakulam	Completed
10	Chellanam	Mech. & Traditional	Ernakulam	Completed
11	Chettuva	Mech. & Traditional	Thrissur	Completed
12	Ponnani	Mech. & Traditional	Malappuram	Completed
13	Thanur	Mech. & Traditional	Malappuram	Completed
14	Parappanangadi	Mech. & Traditional	Malappuram	Work in Progress
15	Beypore	Mechanised	Kozhikode	Completed
16	Puthiyappa	Mechanised	Kozhikode	Completed
17	Koyilandi	Mech. & Traditional	Kozhikode	Completed
18	Chombal	Traditional	Kozhikode	Completed
19	Vellayil	Mech. & Traditional	Kozhikode	Completed
20	Thalai	Mech. & Traditional	Kannur	Completed
21	Azheekkal	Mechanised	Kannur	Completed
22	Moplabay	Mech. & Traditional	Kannur	Completed
23	Cheruvathur	Mech. & Traditional	Kasargod	Completed
24	Kasargod	Mech. & Traditional	Kasargod	Operational
25	Manjeswaram	Mech. & Traditional	Kasargod	Completed

3.4 Resource Potential

3.4.1 According to the available estimates of potential fishery resources of the West Coast, particularly in the south-west coasts, Kerala possesses the richest fishing grounds in the region. Studies estimate that about 8 Lakh metric tonne of marine fish can be sustainably harvested from Kerala waters.

3.5 Marine Fish Production

3.5.1 The actual landing efforts of the traditional craft are virtually confined to 0 to 20 m and mechanised craft upto 50 m. The present level of marine fish production in the state is about 6 lakh tonnes per annum. Hence about 2 lakh tonnes of fish within the maximum sustainable yield is still left un-harvested.

Table 2.2 Marine Fish production of Kerala through 2011-12 to 2021-22

Year	Production in Lakh T
2011-12	5.53
2012-13	5.31
2013-14	5.22
2014-15	5.24
2015-16	5.17
2016-17	4.88
2017-18	4.84
2018-19	6.09
2019-20	4.75
2020-21	3.91
2021-22	6.01

3.5.2 This can be harvested only by increasing the number of fishing days, by providing safe landing facilities, improving the fishing gears, improving the operating range of vessels by providing safe berthing facilities wherever possible.

3.6 Shore Based Facilities

3.6.1 Shore based facilities like ice plants, cold storages etc., are available all along the coastal region. Rigorous fishing activities are already going on in and around the fishing villages of the state.

3.6.2 The shore-based facilities now available at Thiruvananthapuram district will be capable to take care of the additional landing due to up gradation of the fishery harbour. A well-developed road network connecting the coastal belt and the hinterlands makes the transportation of fish and fish products easier. Railways also play a major role in the transportation of fish products.

3.7 Fish Marketing

3.7.1 Fish, Prawns and other High Value Catches are usually auctioned at the local centres immediately after landing. Local private agencies collect most of the prawn for processing.High Value Catches landed will be allocated to export market and about 80% of the rest of the fish landed is taken to the inland markets. The financial institutions in the area as well as co-operative bodies provide financial assistance for marketing.

3.8 Ownership and Management of fleets

3.8.1 Individuals or fishermen groups own traditional as well as mechanized crafts in most of the cases. Matsyafed plays a prominent role in coordinating the entire fishing activities in the fishing villages. Banks and societies also provide financial assistance for the repair of the vessels, purchase of OBMs, fishing gear and other capital investments.

3.9 Fishery Development Programmes

3.9.1 For the proper planned development of fishing industries in Kerala, modernization of existing crafts, introduction of new generation crafts, processing and marketing, landing and shore-based facilities are essential prerequisites.

3.9.2 Basic need for fishing operation either in mechanized or artisanal sector is a sheltered harbour basin, and adequate berthing and anchoring facilities. Kerala is

much ahead in providing these facilities. By now 21 fishery harbour projects are completed and few projects are progressing.

3.9.3 This has brought a sizable income to the fishermen community and the social status has improved very much during the past two decades. Now the focus of the Government is to complete the projects already started, expand the existing one to meet the present day demands and also to improve the facilities in the existing harbours to international standards. State Government is adopting a comprehensive approach towards this, which includes improvement of hygienic standard, providing adequate post-harvest infrastructure and cold storages, facilities for fish processing and value addition.

3.10 Fishing Activities in the Project Region

3.10.1 The general background information regarding the coastal areas of the district is summarised below.

Table 3.3 General Background Information

Kasaragod District		
1	Length of coastline	70 km
2	% Coastline of Kerala state	11.86 %
3	Fish Landings per Year	35163 T
4	% Landings of Kerala State	4.38 %
5	Total Fishermen Population 2022-2023	45919
	Male	18548
	Female	17129
	Children	10206
	Active Fishermen	10928

(Source: Fisheries Guide 2023, Fisheries Department, Kerala)

3.11 Fishing Villages

3.11.1 The details of major marine fishing villages of Kasargod district are given below

Table 3.4Major marine fishing villages of Kasargod district

KASARGOD DISTRICT (16 Nos)			
Sl. No.	**Name of Fishing Village**	**Revenue Village**	**Panchayath**
1	Thrikaripur	Valiyaparambu	Valiyaparambu
2	Valiyaparambu	Valiyaparambu	Valiyaparambu

3	Padannakadappuram	Padanna	Valiyaparambu
4	Thaikadappuram	Neeleswaram	Neeleswaram
5	Kadangode	Cheruvathur	Cheruvathur
6	Poonjakadappuram	Kanhangad	Kanhangad
7	**Hosdurg**	**Hosdurg**	**Kanhangad**
8	**Ajanoor**	**Chithari**	**Ajanoor**
9	**Pallikkara**	**Pallikkara**	**Pallikkara**
10	Kottikulam	Uduma	Uduma
11	Kizhoor	Kalanad	Chemmanad
12	Kasaba	Kasaragod	Kasaragod
13	Kavungoli	Kudlur	MogralPuthur
14	Koyippady	Koyippady	Kumbala
15	Shiriya	Mangalpady	Mangalpady
16	BengaraManjeswar	Hosabettu	Manjeswar

3.12 Benefited Population:

3.12.1 The population of Hosdurg, Ajanoor and Pallikkara fishermen villages is the direct beneficiaries of the project. Population details and fishermen statistics of these villages are shown below.

Table 3.5 Beneficiary Details

Sl. No	Fishermen Village	Population	No. of Registered Fishermen
1	Hosdurg	1575	354
2	Ajanoor	2965	793
3	Pallikkara	2554	991
Total		**7094**	**2138**
Fishermen statistics. Source: Fisheries Dept.			

3.12.2 Statistics of registered fishing crafts is shown in the table below.

Table 3.6 Details of Fishing Vessels Registered at the Base

Sl. No	Fishermen Village	No. of Fishing Crafts		
		Motorised Non Mechanical	Motorised Mechanical	Non Motorised
1	Hosdurg	165	41	9
2	Ajanoor	207	4	13
3	Pallikkara	181	5	8
	Total	**553**	**50**	**30**
Source: ReAL Craft Portal, Dept of Animal Husbandary, Dairying and Fisheries, GoI				

3.13 Marine Fishery Potential of the Kasaragod Region

3.13.1 The annual landings of Kasaragod District during 2003 to 2022 are given below.

Table 3.7 Annual Landings of Kasaragod District

Year	Landings (Tonnes)
2013-2014	38382
2014-2015	51902
2015-2016	45418
2016-2017	28689
2017-2018	52224
2018-2019	35163
2019-2020	12364
2020-2021	19259
2021-2022	20123

(Source: Fisheries Guide 2023, Fisheries Department, Kerala State)

3.14 Fish Marketing

3.14.1 The fish landed are generally auctioned at the auction hall and the local vendors take the fish to export and inland markets. There is a well-developed road network to take the fish to all major inland markets. The site is easily accessible from major roads through a network of coastal roads.

4. MATHEMATICAL MODEL STUDY

4.1 General

4.1.1 Harbour Engineering Department entrusted the model study for constructing an open sea fishery harbour at Ajanur, and river training work of Chithari River near the harbour to CWPRS Pune.

4.1.2 The CWPRS conducted model study and recommended layouts based on the study. It was decided to construct two rubble mound breakwaters of 1150m at the northern side and 425m at the southern end providing a tranquil basin inside the harbour. The northern breakwater of the harbour also acts as river training on one side of Chithari River. Rubble mount breakwater of length 435m is proposed on the other end of the river for river training work. They also conducted desk and wave flume study and recommended the optimum cross-sections for the breakwaters.

4.2 Tidal Levels and Currents

4.2.1 The proposed site of development is about 25 km south of Kasargod. The tides in the region are semidiurnal in nature. The maximum tidal range at Kasargod is about 1.0 m. Tidal currents are generally parallel to the coastal line. Important tidal levels at Kasargod with respect to Chart Datum are reported to be as under:

- MHHW : +1.40 m
- MLHW : +1.30 m
- MSL : +1.0 m
- MHLW : +0.90 m
- MLLW : +0.40 m

4.3 Sediment Characteristics

4.3.1 Bed samples were collected from different locations at the proposed site at Ajanur. Based on the analysis of the bed samples, the average D_{50} is 0.064 mm in sea and D_{50} in river is 0.210 mm. Water samples are collected at river and sea point to estimate the Suspended Sediment Concentration (SSC). It was observed that SSC varies at river point from 0.1 mg/L to 0.15 mg/L. Whereas, variation of SSC is between 0.05 mg/L to 0.11 mg/L at Sea point. The average SSC is 0.210 mg/L and 0.08 mg/L at river and sea point respectively.

4.4 Discharge Data

4.4.1 The river Chittari carries minimal discharge during monsoon and almost no discharge during the non-monsoon season. It was observed that during the time period of field data collection, discharge in the river is only due to influence of tidal fluxes. The river discharge of $6m^3/s$ is obtained through river ADCP observations was considered for non-monsoon season and for monsoon season, $25m^3/s$ discharge was considered for modelling.

4.5 Modelling Techniques

4.5.1 MIKE 21 HD was used to study the hydrodynamics. For studying the sedimentation, MIKE 21 MT module was used. These modules are used for the existing and proposed layouts.

4.6 Littoral Drift

4.6.1 Littoral drift studies reveal that annual southward and northward transports are 0.531Mm3 and 0.118Mm3 respectively with the net and gross transports being 0.413Mm3 and 0.649Mm3 respectively. Due to littoral drift, accretion and erosion are taking place on the north and south sides of the proposed development, respectively. The shoreline evolution after 10 years is predicted as accretion on the northern side extending up to 2500 m along the shore and about 68 m in cross shore direction, and as erosion on the southern side extending up to 1500 m along the shore and about 40 m in cross-shore direction. It was observed that the shifting of the river mouth is about 200 m towards the north over a year.

4.7 Flume Studies

4.7.1 Desk and wave flume studies were conducted to evolve the cross-section of breakwater based on the actual site survey data and other hydraulic parameters. Design of breakwater with tetrapods in the armour was evolved based on the desk and wave flume studies.

4.7.2 The hydraulic stability tests were conducted in the wave flume by reproducing the section to a Geometrically Similar model scale of 1:29. For the design of breakwater, water level of 2.60 m was considered as the Design Water Level, 1.40 m above the HWL (Storm Surge + Sea level rise). The significant wave height of 4.0 m was considered for the design of breakwater

4.8 Conclusions of Study

4.8.1 The final layout for the fishing harbour was decided based on the layout options proposed based on wave tranquillity study. An open sea harbour with north breakwater of 1150 m length, south breakwater of 425 m length and 435 m breakwater as river training work at the mouth of Chittari river is adopted as the final layout.

4.8.2 The sedimentation pattern for the proposed condition shows sedimentation of the order of 0.045m per annum near the river mouth. Sedimentation is also noticed near the north and the south breakwaters (0.05 m in a year). In the fishing harbour area sedimentation of about 0.03 m in a year is estimated.

4.8.3 If the erosion on the south side of the proposed fishing harbour is progressive after the development then a suitable shore protection measure in the form of a seawall or series of groynes may be provided.

4.8.4 If the shifting of the river mouth is pronounced after the proposed development of the river training works then a seawall of appropriate length may be provided to arrest the shifting of the river mouth.

5. SMART INFRASTRUCTURE AND AUTOMATED SYSTEMS

5.1 Introduction

The Third Industrial Revolution or Digital Revolution refers to the technological progress from analogue circuits and mechanical devices to the digital technology we use today. In the late 1990s and 2000s, the Information Technology (IT), with its high performance and low cost of computers and high capacity and speed of communications such as the Internet, contributed greatly to the efficiency and globalisation of transactions. In the 2010s, IT has shifted to the Information and Communication Technology (ICT), emphasizing the importance of communication technology between people and between people and things, and the sharing of information and knowledge through network communication. ICT includes not only traditional communication devices such as PCs and smartphones, but also the Internet of Things (IoT) and the use of big data. Advances in the Third Industrial Revolution have made human intellectual work more efficient.

The Fourth Industrial Revolution is characterised by emerging technological innovations in areas as diverse as robotics, AI, nanotechnology, biotechnology, quantum computing, IoT, 3D printing and virtual reality. In recent years, the widespread use of the Internet and high-speed communications in all areas of the industry, society and life has led to the connection of people through PCs, smartphones and tablets, and also to the connection of things through the IoT. In addition, services with a variety of applications are becoming more readily available. In particular, developments in robotics and AI technology have the potential to change the way we work. The Digital transformation (DX), the concept that digitization changes social life, the economy and business for the better, is being promoted.

5.2 Objectives and effects of ICT and IoT utilization

Electronic auctions have long been widespread in fishing harbour markets, and online auctions are now available from anywhere in the world, without the need to visit the market. The website of the fishing harbour provides not only information about the auction, but also about the restaurants in the harbour and its surroundings. Good information spreads quickly through social networks. The number of personnel at the auction hall is also decreasing. There are PCs in the administration office, and

communication with buyers and masters or owners of fishing boats is done via the internet rather than by telephone. Automatic sorting and grading machines are used for certain species of fish, as it is difficult to sort and grade fish manually. ICT, IoT utilization refers to the computerization of information from paper form to electronic form and the internet of people and things. In this way, ICT, IoT utilization can be seen in the operation of fishing harbours, and the use also seems to be reaping the benefits of these technologies.

The followings are the objectives and effects for which ICT and IoT are used so that fishing harbours can fulfil their roles and functions properly:

i Ensuring transparency, parity and fairness;

Dissemination of information via the internet & website, etc.

ii Efficiency in sales operations;

Weighing scale, sorting & grading machine, electronic auction, etc.

iii Maintaining and increasing sales;

Greater participation of buyers, including from outside the local, through electronic and online auction

iv Ensuring safety and quality;

Labelling, electronic record for the HACCP system, etc.

v Ensuring resource management;

Electronic recording and reporting catch and sales information, etc.

vi Ensuring traceability and sustainability;

Electronic issue of invoices and labelling, etc.

vii Improving safety of navigation and fishing operation; and

Electronic information, etc.

viii Efficiency in financial management, etc.

Electronic record

5.3 Dissemination of information via the internet & website

A fishing harbour is the base of the fishing industry, where the catch is landed and sold, and where processing and distribution are concentrated. People involved in the fishing industry want to be able to access information about the fisheries, the fishing industry and the fishing harbour. On the other hand, the administrator and operator of the fishing harbour and market are required to ensure transparency, fairness and equity in their administrations and operations. These imply the importance and necessity of disclosure and provision of information.

5.3.1 Internet & website

As a method of disclosure and provision of information, it is appropriate to make use of ICT, which is widely used in industry and daily life. The administrator and operator use the internet to set up a website, post information on the website, and make the information available to users. Confidential information, which is inappropriate for disclosure and which identifies the user, can be made accessible only to users who registered in advance and enter your ID and password in the dedicated login.

5.3.2 Contents of information

The information provided on this site is broadly classified into the following categories: information about the Harbour Authority, information about the fishing harbour, information about the fishing industry, information about the market, information about safety and quality of fish and fishery products and other useful information. The users of the information include fishermen, buyers and other traders, processors, transporters and suppliers of ice and oil. Depending on the nature of the information provided, the users of that information also differ.

In the case of a harbour authority setting up a website, the following is a list of appropriate contents of the information:

1 Harbour administration’s information

- Mission
- Organization (Organizational structure, board members, staff)
- Documents (Annual financial plan and report)

2 Harbour information

- Roles or functions (Roles or functions of harbour and market)
- History (History, development of harbour)
- Layout of harbour facilities (Breakwaters, quays, waterways, basins, handling hall, auction hall, administration office, freezing and refrigeration facilities, buyer's warehouses, parking lots, fishing vessel building and repair yard, fishing gear drying ground, processing factories, logistic terminal, etc.)
- Hinterland (Fishing communities or town)
- Harbour services (Landing fish, idling vessels and preparing for fishing, cranes and hosts for fish landing, fishing vessel building and repair yard (boatlift, slipway, dry dock), ice supply, water supply and fuelling, lending and collecting fish boxes, fuelling facilities, etc.)
- Rules for use of harbour facilities and services

3 Fisheries information

- Types of fisheries (Fixed-net fishery, purse sein fishery, trawl net fishery, etc.)
- Fishing fleet (Overhaul length, horsepower, gross tonnage, types of fisheries, fishing grounds, etc.)
- Fish and fishery products (Fish caught, landed or unloaded, auctioned, processed fishery products)
- Fishery product processing and marketing

4 Sales information

- Collection of landings (i.e. landing station or landing point)
- Auction (How the auction works, landing times, auction days/times).
- Fishermen (Register (ID and password), How you can provide landings information. fees and charges, rules and forms)
- Buyers (Register (ID and password), How you can buy fish at the auction. fees and charges, rules and forms)
- Expected landings (Catch method, species, grade, volume (number of boxes), download or print out of PDF, Excel file or CSV file)

- Today's sales catalogue (Fishing boat's name or number, catch method, species, grade, volume (number of boxes), download or print out of PDF, Excel file or CSV file)

- Prices (Sales date, fishing vessel, species, grade, volume (number of boxes), maximum prices, average prices, download or print out of PDF, Excel file or CSV file)

- Services (Sorting, grading and weighing, ice supply, clean water supply, fish boxes, packing and shipping purchased fish and fishery products)

- Documents (Invoices, landing statements, etc.)

5 Safety and quality of fish and fishery products

- Quality management

- HACCP system (Videos and photos)

6 Fish resource management

7 Fisheries statistics

- Weekly, monthly and yearly landings

- Download or print out of PDF, Excel file or CSV file

8 News & topics

9 Practical information

- Meteorological and oceanographic information

- Traffic information

10 Contact

5.4 ICT, IoT-utilized sales

5.4.1 Recording, reporting and transmitting information on the catch and trade

Figure 6.1 shows the EU and US system for recording, reporting and transmitting information on the catch and trade of fish and fishery products to ensure fisheries resource management. An auction hall located at a fishing harbour is the first sale point where fish and fishery products received from producers are sold to buyers (processors or distributors), and is the only place (database) where catch and sale information can be accurately recorded.

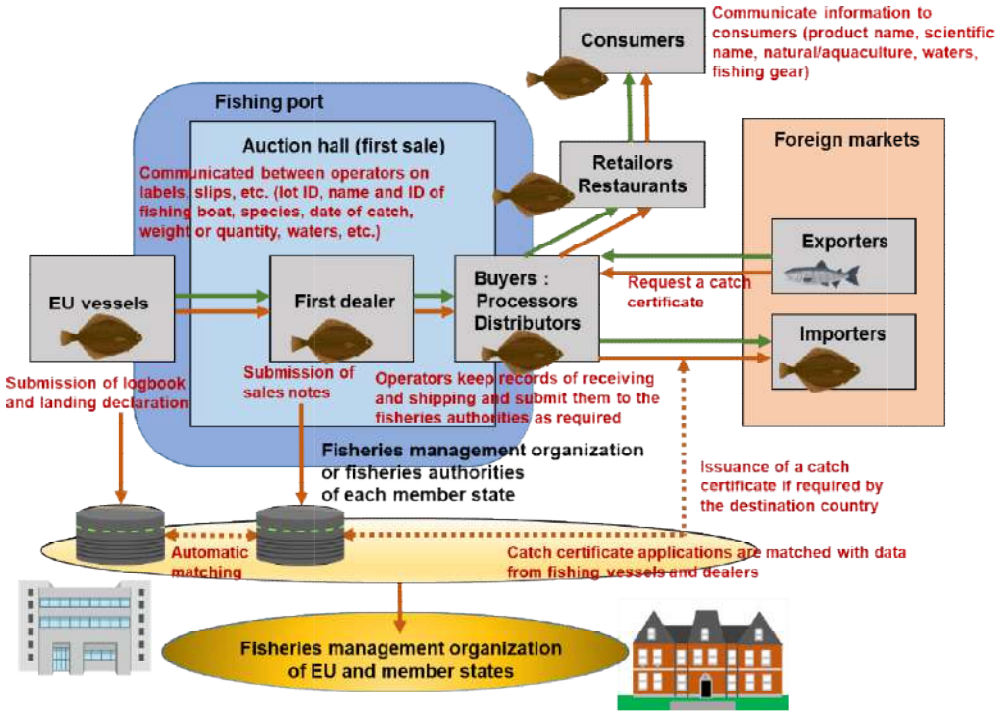


Figure 6.1 EUsystem forrecording,reportingandtransmittinginformation on the catch and trade

Figure 6.2 shows how ICT and IoT are utilized in the EU system. ICT, IoT utilization in sales means not only the electronic auction, but also the entire process of reporting catch information to the fisheries authorities and providing it to the market, landing at the fishing harbour and bringing it into the market, washing, sorting & grading, weighing, auctioning, delivery, shipping, issuing invoices (landing statements) to producers and bills (sales notices) to buyers, and reporting the results of sales (sales notes) to the fisheries authorities (or fisheries management organization).

The key to this computerization is a database in which the information on catch and sales is automatically recorded, through the electronic auction. Documents such as sales notices and the reports such as sales notes can be automated by pulling the necessary information from the database. The database can also facilitate the issuance of catch certificates and the provision of traceability information, which is necessary when exporting fish and fishery products, with a high degree of reliability and speed.

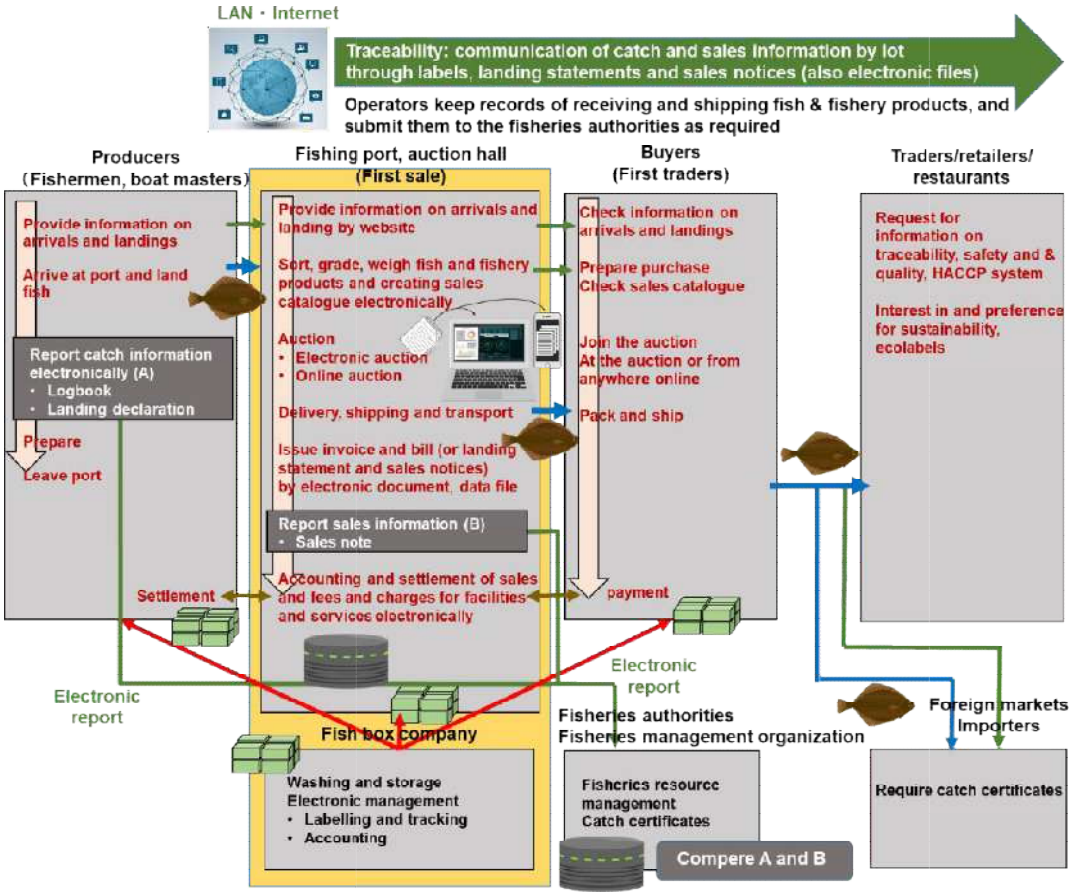


Figure6.2EUsystem utilizingICT,IoT

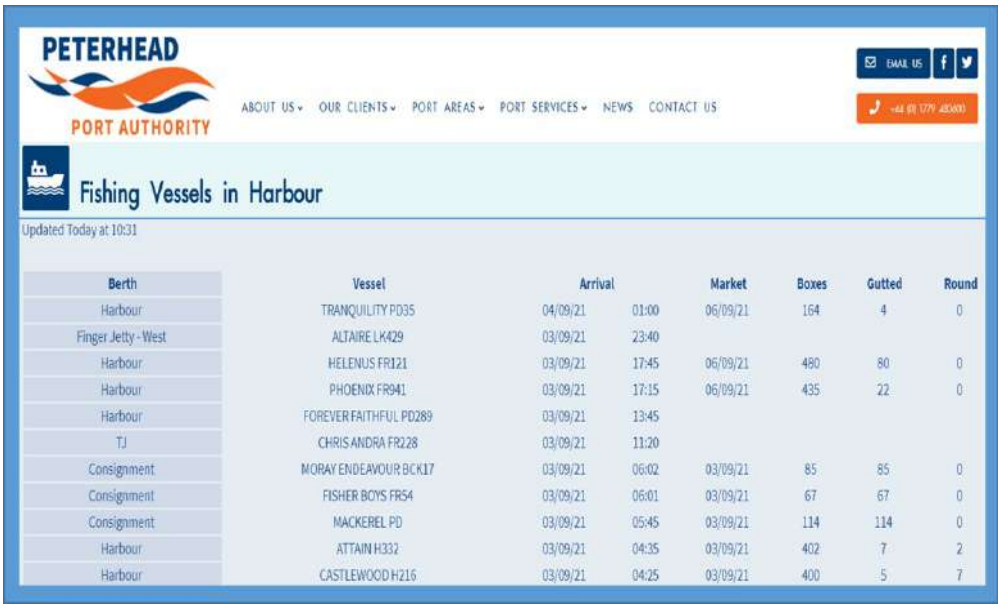
5.5 ICT, IoT utilization according to sales process

5.5.1 Arrival of fishing vessels and landing information

Information on the date and time of arrival of fishing vessels and the landings is transmitted from the fishing vessels to the auction hall via the fishing vessel owner's office by telephone or internet the day before the sale or by the time of the auction. In some cases, reports to the fisheries authorities (or fisheries management organization) are also provided by the fishing vessels to the auction hall via the internet. Small fishing vessels operating day-trip coastal fishing catch a small quantity and variety of fish. So, small fishing vessels are not required to provide landing information to the auction hall. However, when the fishing vessels have catch larger than usual, they provide landing information to the auction hall by mobile phone.

The fishing vessels arrival information includes the fishing vessel's name, the date and time of arrival, the expected date of sale, the species of fish and the number of fish

boxes or the catch. Landing information includes the name of the fishing vessel, species, grade, the number of fish boxes or the catch and also information on the species eligible for ecolabel fishery certification. This information is uploaded to the website, posted in the waiting & resting room for buyers, etc. of the auction hall. Figure 6.3 shows an example of providing arrival of fishing vessels and landing information on the website wet up by the Harbour Authority.



Berth	Vessel	Arrival		Market	Boxes	Gutted	Round
Harbour	TRANQUILITY PD35	04/09/21	01:00	06/09/21	164	4	0
Finger Jetty - West	ALTAIRE LK429	03/09/21	23:40				
Harbour	HELENUS FR121	03/09/21	17:45	06/09/21	480	80	0
Harbour	PHOENIX FR941	03/09/21	17:15	06/09/21	435	22	0
Harbour	FOREVER FAITHFUL PD289	03/09/21	13:45				
TJ	CHRIS ANDRA FR228	03/09/21	11:20				
Consignment	MORAY ENDEAVOUR BCK17	03/09/21	06:02	03/09/21	85	85	0
Consignment	FISHER BOYS FR54	03/09/21	06:01	03/09/21	67	67	0
Consignment	MACKEREL PD	03/09/21	05:45	03/09/21	114	114	0
Harbour	ATTAIN H332	03/09/21	04:35	03/09/21	402	7	2
Harbour	CASTLEWOOD H216	03/09/21	04:25	03/09/21	400	5	7

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LATEST FISH LANDINGS

Vessel	Total Boxes	Cod	Monks	Haddock Lrg/Med	Haddock Sml	Haddock Sml Round	Whiting	Whiting Round	Saithe	Megrim	Squid	Hake	Lemons	Plaice	Witches	Ling	Others
PHOENIX FR941	435	17	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3
				124	206		13		14			53		3			
HELENUS FR121	480	20	0	0	0	0	20	0	0	0	0	0	0	0	0	5	35
				40	270				20			65		5			
TRANQUILITY PD35	164	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
					6	150						1		3			
SHALIMAR PD303	852	110	10	0	0	0	0	110	0	2	0	0	4	0	5	3	30
				65	355	25	25		55			50		3			
FALCON H119	861	89	7	0	0	0	0	110	0	4	0	0	3	0	3	5	55
				80	360	34	30		35			40		6			
VICTORIA MAY SF267V	715	65	130	13	13	15	0	3	281	0	0	12	0	0	0	38	145
EMULATOR SH83	193	111	9	0	0	0	2	0	0	0	0	0	4	0	2	1	11
				4	8				31			1		11			
STEADFAST HOPE BF340	190	15	30	0	0	0	10	55	0	0	0	0	0	0	10	2	3
					45				20								
Totals	3890	427	188	13	13	15	36	278	281	6	0	12	11	0	20	54	282
				313	1248	209	68		175			210		31			

MSC fish are shown in blue or shaded boxes. Vessels are responsible for the declaration.
Responsible Fishing Scheme certified vessels are highlighted in yellow.

Source:https://www.peterheadport.co.uk/

Figure6.3Arrivaloffishingvesselsandlandinginformation,Peterhead,UK

5.5.2 Landing and bringing in the auction hall

On the day before or on the day of the scheduled sale, the fish are removed from the hold in fish boxes using cranes on board or on the quay and brought in the main building of the auction hall on forklifts or trolleys. Floating fish (pelagic fish) are taken directly from the hold to the tanks on the quay or into the main building by fish pumps or nets. The fish boxes and tanks are placed in a cold controlled area soon after landing to ensure freshness.

Figure 6.4 shows the labels on the fish boxes landed at Lerwick and Scalloway. The fish has already been sorted and weighed on board before landing and includes information such as fishing vessel's name, species and weight by fish box.

Figure6.4Labelsattachedtothefishboxeslandedatthequays,Lerwick &scalloway,UK



Label in the fish box | Label attached to the fish box | Landing and bringing into the main building of the auction hall

5.5.3 Sorting, Grading, Weighing fish and creating sales catalogue

5.5.3.1 Sorting and grading

Catch may be sorted, graded and weighed on board (depending on the species, primary treatment such as gutting may be also carried out on board), and a label with their results (fishing vessel's name, catching area, species, grade, weight, etc.) attached to the fish box, as shown in Figure 3.4. The content of the label attached to the fish box is scanned and additional information such as the quality level added from a tablet/PC terminal. Even if fish are weighed in advance, the information on the label may be incorrect or the label may be unclear, and in order to ensure traceability with accurate information, fish are weighed on a sample basis by fishing boat, species and grade for check.

In the case where the catch has not been sorted, graded and weighed on board, the automatic fish species sorting machine may be used for horse mackerel and other species and the automatic fish grading machine may be used for flatfish, flounder, skipjack, salmon, etc.

Figure 6.5 shows the automatic grading machine at Scalloway, UK, and Figure 6.6 shows other examples.



Figure6.5Automaticgradingmachineforflatfish,Scalloway,UK



Grading machine for salmon
Ishinomaki, Japan

Grading machine for ??
Tarragona, Spain

Figure 6.6 Other examples of automatic grading machines

5.5.3.2 Weighing and creating sales catalogue before auction

The fish box with fish in is placed on the weighing terminal and the catch information such as the fishing vessel's name and number, start and end dates of catch, catch area, and fishing method is entered from the panel of the weighing terminal as shown in Figure 6.7. The information such as species, grade in size, condition (fresh, frozen, etc.) and quality level and eco-label certification is also entered. The information is automatically sent to the server at the time of weighing, resulting in printing a label containing the information, which is posted on the side of the fish box or placed in the fish box. It is relatively easy to create a sales catalogue by drawing the necessary data from the server.



Figure 6.7 Weighing terminal, Boulogune-sur-Mer, France

The sales catalogue may be created by entering the information on the labels or slips (small sheets of paper) in the fish box from a tablet/PC terminal as shown in Figure 6.8. As most of the necessary information about the fish is defaulted, has to be actually entered from the weighing panel, or tablet/PC terminal. Sales catalogues are printed out and distributed to buyers, or pre-registered buyers can log in to the website to view, print out or download (as a PDF file).

Figure 6.9 shows the forklift with a tablet-mounted weighing scale and fish tanks with IC tags at Ofunato, Japan. RFID tags are attached to the fish tanks, one at the front and the other at the back of the tank. The weighing results by using a forklift weighing scale are linked to the tank number read from the RFID tag and sent to the server for recording. A tank of seawater or ice is pre-weighed and then the tank is weighed with the fish in it. By subtracting the weight of the former from that of the latter, the net weight of the fish is obtained.



Figure 6.8 Creating sales catalogue, Skagen, Denmark

Figure 6.9 shows other examples of weighing scales with ICT, IoT utilized.



Figure 6.9 Forklift with tablet-mounted weighing scale and fish tanks with IC tags, Ofunato, Japan

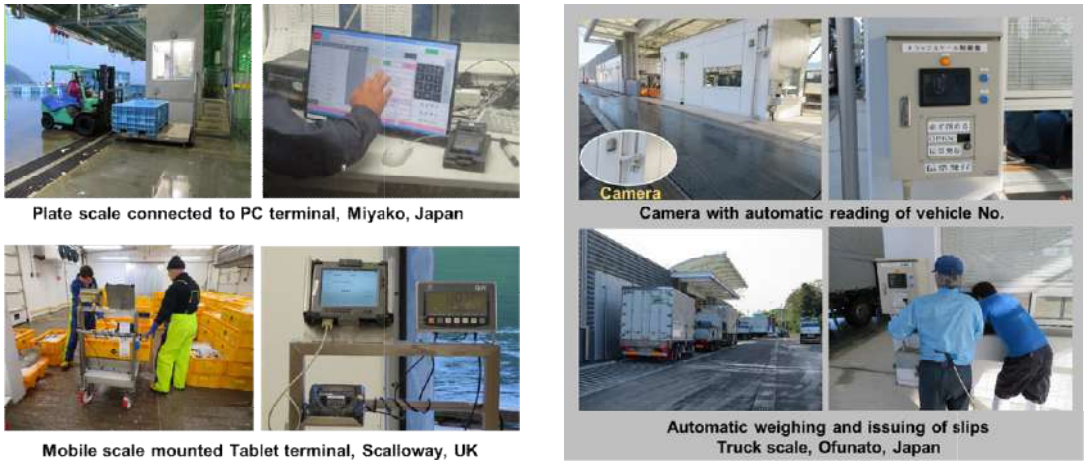


Figure 6.10 Other examples of weighing scales with ICT, IoT utilized

5.5.3.3 Weighing and creating sales catalogue in the course of auction

Fish boxes with fish in by fishing vessel are placed on the conveyor belt moving to the auction area. When the fish box reaches the scale on the conveyor belt, it is automatically weighed. Figure 6.11 shows the weighing and creating a sales catalogue at Lorient-Keroman, France. Market personnel enter the information about the fish other than the weight, resulting in creating a sales catalogue. The information for sale is shown on the screen or electronic display in the auction hall.



Figure 6.11 Weighing and creating a sales catalogue, Lorient-Koroman, France

Figure 6.12 shows the weighing and creating a sales catalogue while fish boxes with fish in are moving on the conveyer belt at Civitanova, Italy. In the cabin near the auctioneer, information such as the fishing vessel's name and number, catch area,

species, grade in size, condition and quality level other than the weight are entered from a PC terminal, and a sales catalogue is created. The video footage of the fish and information for sale are shown on the screen in the auction hall. The auctioneer announces the quality of the fish to the cabin and the auction for each sales lot begins.



Figure6.12 weighingandcreating asalescatalogue while the products aremovingon the conveyor belt, Civitanova, Italy

5.5.4 **Auction**

5.5.4.1 History of electronic auction

Electronic auction was first introduced in the late 1980s to save labour and time, improve efficiency and avoid manual errors. In the 1990s, PCs became more sophisticated and network connections, such as LANs, were used for more sophisticated work. The opening of the Internet, developed in the United States, to the private sector accelerated informatization, and from the mid-1990s the Internet spread rapidly throughout the world, enabling the instantaneous and interactive exchange of a large amount of information. Moreover, the development and widespread use of mobile phones has made it possible to exchange information from any location. This has led to the introduction of online auctions, where buyers from all over the country and the rest of the world can participate via the internet. The number of markets conducting online auctions has increased since 2000 due to the widespread availability of broadband and

also the increasing use of smartphones in the 2010s. A web-based transaction system has also been launched.

As buyers may participate in the auction from all over the world, it is a prerequisite that a quality assurance system for fish and a delivery system from the auction hall are in place. For the quality assurance system, there are EU quality criteria and more detailed criteria set up by Scandinavia and other exporting countries. As for the delivery system, it must be punctual and ensure a cold chain up to the buyer's designated destination. The Nordic and Scottish markets, such as Norway, Denmark, the Faroe Islands and Shetland (UK), meet these requirements, and rely heavily on online auctions.

5.5.4.2 Classification of auctions in terms of the utilization of ICT, IoT

Auction is a very old tradition of selling or buying of products and services which allows the highest bidder to get hold of them. According to the extent to which ICT, IoT is used for computerization, automation and systematization of the auctions, they are classified as follows:

1 Conventional auction/manual auction (local auction/physical attendance auction);

The auctioneer starts the auction with a shout in front of the fish. In the case of an ascending auction, the buyer voices the price or indicates it with his finger. In the case of a descending auction, the auctioneer shall state the price and the buyer shall respond to it by voicing or gesturing.

2 Electronic auction (local auction/physical attendance auction);

Computers have been introduced to automate and systematize the auctioneering process. The information about the fish is displayed on an "auction clock" - electronic board or screen - , and the buyers join the auction while looking at the fish. The buyer presses a key on a remote control or pad at the price he wants to buy. A computer network (LAN), has been set up, with wireless or wired connections between server, computers, remote controls and terminals. The information converted into database as the auction progresses would contribute to the automation and efficiency of the work that follows the auction, such as the issuance of invoices and sales notices.

3 Electronic auction (Online auction/internet auction/remote auction);

By connecting the auction hall’s computer network (LAN) to the internet, it is possible to participate in the auction in real time from anywhere in the world, without having to

go to the auction hall (not physical attendance), as far as buyers have PCs, tablets or smartphones with an internet connection. It is also possible to participate in more than one auction or market simultaneously. This would lead to the more new buyers.

4 Electronic auction at the virtual market (first-price sealed-bid auction online); and

The virtual market is built in cyberspace and first-price sealed-bid auctions online take place. In the virtual market, the market in cyberspace, the producers (fishing vessels) at sea and buyers (processors) around the world are linked via the internet, and once each auction is completed, the fishing vessel goes directly from the fishing grounds to the processing plant designated by the buyer. In addition to the benefits of electronic auction, the separation of sales and logistics saves labor and time, and contributes to keep the catch fresh. On the other hand, it is noted that it is difficult to find a link with the function of fishing harbours.

5 Web transaction/negotiated transaction.

Via the internet, sellers and buyers negotiate with each other on the web and decide on items, prices and quantities in advance or at the auction.

With the utilization of ICT, IoT, auctions are held in different locations - display area, auction area, auction room, anywhere inside and outside the auction hall, virtual market.

5.5.5 Delivery, dispatch and transport

The fish auctioned off are checked by the market personnel for the contents of the labels in or on the fish boxes and are placed together in the designated area for each buyer, who has purchased them, where the fish are delivered from the market to the buyers. Then the fish are either dispatched from the auction hall by truck, carts or forklift as they are or, after packed.

The label contains catch and sales information that identifies the fish by lot, which is also necessary information to ensure traceability. Traceability information can be obtained in a variety of formats (PDF, Excel and CSV files) by reading it with a smartphone or other device from the barcode or QR code on the label on the fish box.

Figure 6.13 and 6.14 show the labels and the information contained therein in or on the fish boxes at Giulianova, Italy, and at Gilleleje, Denmark respectively.



Figure 3.13 Delivery of fish with a label in the fish box, Giulianova, Italy

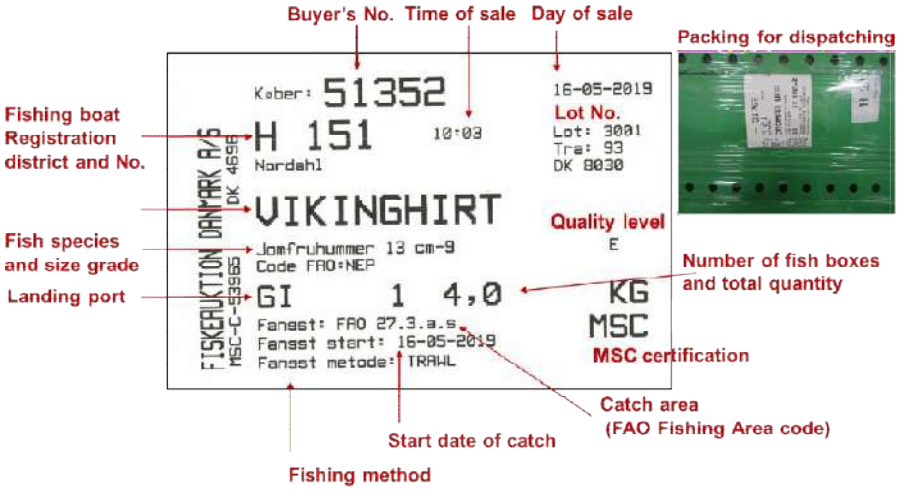


Figure 6.14 Delivery of fish fishery products with a label in the box, Gilleleje, Denmark

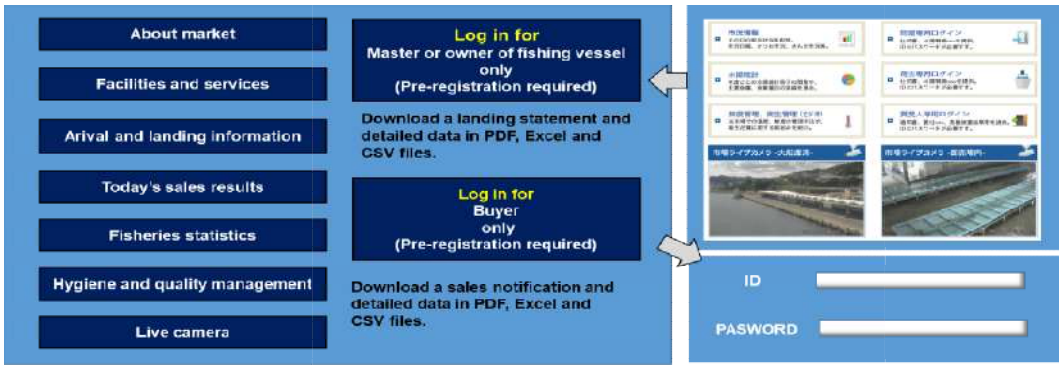
5.5.6 Issuing landing statements and sales notices

Information on the catch and sale is recorded electronically on the auction hall's server through the sales process. After the day's sales, landing statements to producers and sales notices (invoices) to buyers are automatically created by drawing necessary information from the server. A landing statement is a vessel-by-vessel list of which fish and have been purchased and by whom. A sales notice (invoice) is a bill for the fish purchased by the buyer.

Fishing vessel's owners or buyers receive these documents manually or electronically as follows:

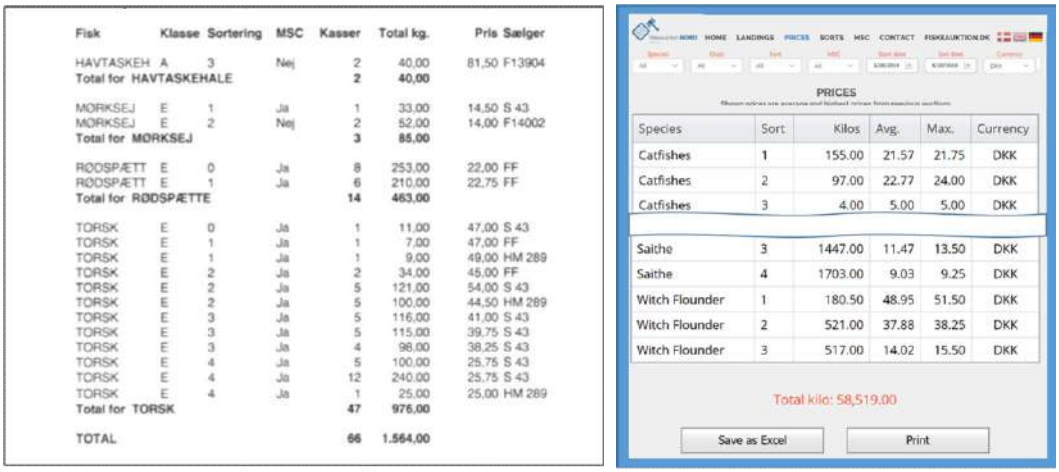
- The market personnel print out the documents on paper and post them in the boxes of the buyers and the fishing vessel's owners respectively;
- The personnel send the PDF file or other type of file to the buyers and the fishing vessel's owners by email; and
- Buyers and fishing vessel's owners log in the dedicated website to view and download them and detailed data in PDF, Excel and CSV files.

The day's sales results (fish species, grades, quality levels, prices, etc.) are uploaded on the website, soon after the auction.The landing statements and sales notices contain catch and sales information that identifies fish, and these documents can be recorded electronically by the vessel owners, buyers and market personnel to ensure traceability. Statistical information on the volume and value of sales by fish species and fishing method is reported monthly to the municipal and state statistical authorities and to the fisheries authorities. The accounting of commissions, charges, taxes associated with sales and other services is also computerized.



http://www.ofunato-fm.com

Figure 6.15 Website for download of landing statements and sales notices, Ofuna, Japan



Fisk	Klasse	Sortering	MSC	Kasser	Total kg.	Pris Sælger
HAVTASKEH	A	3	Nej	2	40,00	81,50 F13904
Total for HAVTASKEHALE				2	40,00	
MØRKSEJ	E	1	Ja	1	33,00	14,50 S 43
MØRKSEJ	E	2	Nej	2	52,00	14,00 F14002
Total for MØRKSEJ				3	85,00	
RØDSPÆTT	E	0	Ja	8	253,00	22,00 FF
RØDSPÆTT	E	1	Ja	6	210,00	22,75 FF
Total for RØDSPÆTTE				14	463,00	
TORSK	E	0	Ja	1	11,00	47,00 S 43
TORSK	E	1	Ja	1	7,00	47,00 FF
TORSK	E	1	Ja	1	9,00	49,00 HM 289
TORSK	E	2	Ja	2	34,00	45,00 FF
TORSK	E	2	Ja	5	121,00	54,00 S 43
TORSK	E	2	Ja	5	100,00	44,50 HM 289
TORSK	E	3	Ja	5	116,00	41,00 S 43
TORSK	E	3	Ja	5	115,00	39,75 S 43
TORSK	E	3	Ja	4	98,00	38,25 S 43
TORSK	E	4	Ja	5	100,00	25,75 S 43
TORSK	E	4	Ja	12	240,00	25,75 S 43
TORSK	E	4	Ja	1	25,00	25,00 HM 289
Total for TORSK				47	976,00	
TOTAL				66	1.564,00	

List of purchased fish and fishery products

Species	Sort	Kilos	Avg.	Max.	Currency
Catfishes	1	155.00	21.57	21.75	DKK
Catfishes	2	97.00	22.77	24.00	DKK
Catfishes	3	4.00	5.00	5.00	DKK
Saithe	3	1447.00	11.47	13.50	DKK
Saithe	4	1703.00	9.03	9.25	DKK
Witch Flounder	1	180.50	48.95	51.50	DKK
Witch Flounder	2	521.00	37.88	38.25	DKK
Witch Flounder	3	517.00	14.02	15.50	DKK

Sales result

http://www.hirfiskauk.dk/Prices

Figure 6.16 Purchase list printed out and sales results on the website, Hirtshals, Denmark

Figure 6.15 shows the website where landing statements, sales notices and their detailed data in PDF, Excel and CSV files can be downloaded at Ofuna, Japan. Today's sales results, and fisheries statistics also be downloaded. Within an hour after the end of the day's sale, landing statements and sales notices are issued, followed by the sales results uploaded.

Figure 6.16 shows the purchase list printed out and sales results at Hirtshals, Denmark. There is a printer in the auction hall, and when a buyer puts his chip on the sensor, a list of fish purchased up until now is printed out.

5.6 Service charges

To ensure safety and quality of fish and safety and efficiency of operations for sale, clean seawater, tap water, ice and electricity are consumed, and machine and equipment such as electric forklifts, carts, and grading machine are used. Users shall be properly charged, in accordance with the rules. The more electronically the information on users' charges are recorded in real time, and invoices and bills are issued soon, the more efficient operations are carried out and the more labor and time are saved.

Figure 6.17 shows the management system for forklift use and its electricity charges at Ofuna, Japan. Each time a user charges a forklift, information on its use is automatically

recorded on a server in the central computer room. Users other than market personnel are charged according to their use of the forklift and the electricity.

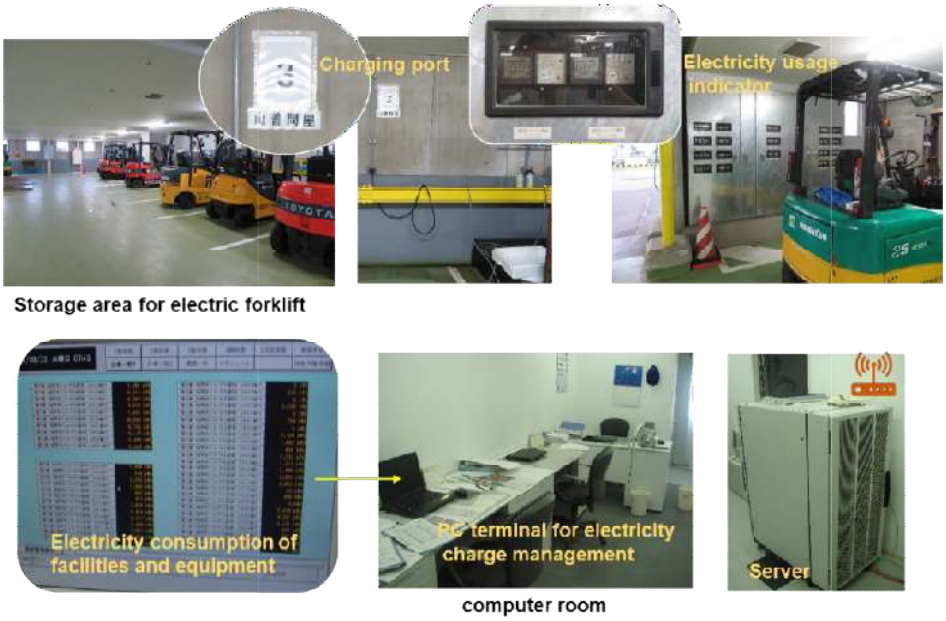


Fig. 6.17 Management system for forklift use and its electricity charges, Ofuna, Japan

5.7 HACCP system facilitated by ICT

At the auction hall where fish and fishery products are sold, the HACCP system is applied for food safety. Specifically, the auction hall is required to maintain and improve its structures & facilities, and machinery & equipment as well as provide guidance to users and maintain records of the measures taken to control hazards. As a part of the HACCP system, the person responsible draws up a management manual, which will be followed by the relevant personnel who will check the status of management at the control points and record the results in a record book (on paper generally). The person responsible finally confirms the results of the checks made by the personnel and keeps the record book.

Considering the limited number of personnel and their time, it is necessary to have a computerized system that can automatically manage the hygiene of people and vehicles entering and leaving the auction hall and fishing harbour, and easily record the results of hygiene management and provide them quickly upon request. The utilization of ICT in the control of the entry and exit of people and vehicles, and in recording the check results at the control points, can save personnel and time for the HACCP management.

5.7.1 Automatic entry and exit management system

The automatic entry and exit management system for vehicles automatically authenticates the vehicle at the gate to ensure that it is a pre-registered vehicle, and also works in conjunction with the car wash facilities and gate operation to automatically control the hygiene and safety of vehicles entering the landing and clearance area. The vehicle can be identified either by contact, using an ID card, or non- contact, using an automatic reading of the vehicle number. The system eliminates the need of assigning the personnel to control whether vehicles are entering the auction hall properly, and ensures that the auction-related people (market personnel, buyers, distributors and transporters, etc.) comply with hygiene management for vehicle entry.

Figure 6.18 shows the example at Ishinomaki, Japan. Vehicle entry and exit facilities using contactless transit cards have been installed at the gate of the access road to the quay, allowing only authorised vehicles to enter. When a vehicle enters or exits the quay, the number on the vehicle's number plate is read at the gate, and if the vehicle is not registered, it is either not allowed to enter or is checked by the market personnel using a live camera, and if there is no problem, it is registered before being allowed to enter. There is also a car wash area at the entrance gate after passing through the gate, where water is sprayed in conjunction with the gate to wash tyres. At this time, video footage of the tyre washing process is recorded.

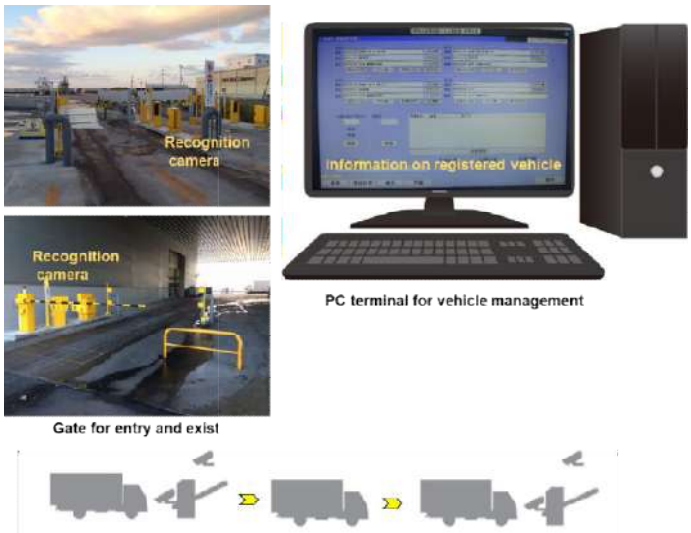


Figure 6.18 Automatic entry and exit management system for vehicles, Ishinomaki, Japan

The automatic entry and exit management system for people confirms that the person has been registered in advance and automatically carries out hygiene and safety control in the workplace by opening the entrance door to the workplace in conjunction with hand washing, hand disinfection, changing into boots and boot washing. There are two methods of automatic authentication: contact method using ID cards and non-contact method using automatic reading of ID cards.

Figure 6.19 shows the example at Ishinomaki, Japan. All those entering the auction hall are required to wash their hands, disinfect their hands and wash their boots in the access control room, and only those who are authorized by ID authentication are allowed to enter. The washing of hands and boots is recorded on video.



Figure 6.19 Automatic entry and exit management system for people, Ishinomaki, Japan

5.7.2 **Camera system**

By placing cameras at various locations in the fishing harbour, including inside and outside the auction hall, the use of the fishing harbour such as the arrival, landing, anchoring and preparation for departure of fishing boats, the sales situation in the market, as well as the hygiene management status can be centrally monitored, recorded in real time from a PC terminal in the office.

Figure 6.20 shows the centralized surveillance camera system at Akkeshi, Japan. Twenty-three cameras are installed in the fishing harbour, and PC terminals in the administration office allows the harbour and market personnel to view video footage in real time, as well as video footage automatically recorded on a server for the past two weeks. These images are used to check the entry of suspicious persons and non-authorized vehicles.

Figure 6.21 shows CCTV installed along the auction lean, Tarragona, Spain. Although there are differences in system structure and function between CCTV and surveillance cameras, both are installed and centrally controlled to monitor harbours and check the safety of operations in markets and other areas.



Figure 6.20 Surveillance cameras installed throughout the fishing port, Akkeshi, Japan

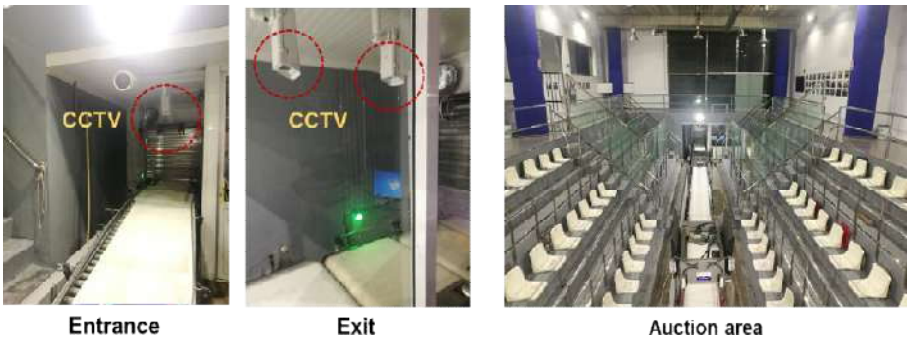


Figure 6.21 CCTV instolled along the auction lean, Tarragona, Spain

Figure 6.21 shows CCTV installed along the auction lean, Tarragona, Spain. Although there are differences in system structure and function between CCTV and surveillance cameras, both are installed and centrally controlled to monitor harbour and check the safety of operations in markets and other areas.

5.7.3 Electronic recording for HACCP management

In accordance with the HACCP system, the relevant personnel check the hygiene management status at the control points and enters the results on the spot from the tablet terminal and records them on the server. The recorded information can be retrieved from the server by the person responsible for the hygiene management, hygiene controller, at any time, from anywhere, using a tablet or PC terminal, for final verification and storage.

5.8 Electronic information for traceability

Figure 6.22 shows a sales plate with traceability information, Spain. In response to growing consumer interest, retailers are selling fish with plates containing not only the price but also information on where and how the fish was caught, under the initiative of the Catalan Consumer Agency.

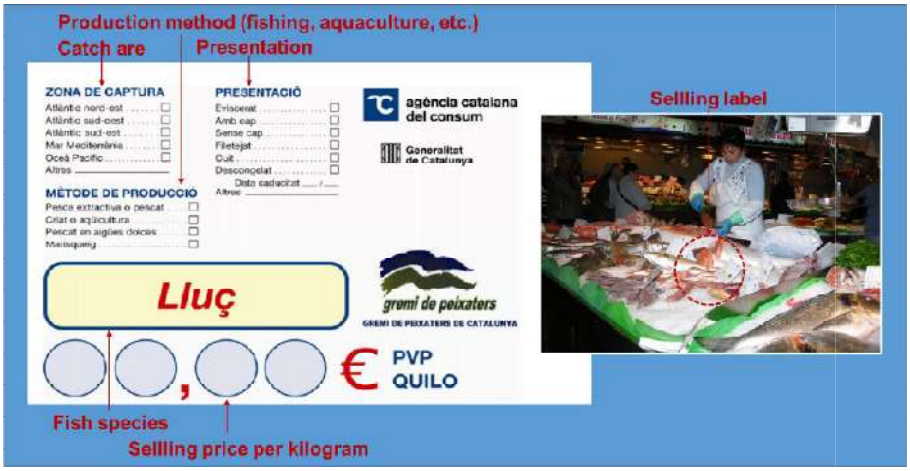


Figure 6.22 Sales plate with traceability information, Spain

The EU is described here as an example of how the necessary information is created, recorded and transmitted electronically in order to ensure traceability.

Lot-based traceability is the basic principle, and traceability information is transmitted on labels or vouchers by stating the lot ID, name and ID of the fishing vessel, species,

catch date, weight or quantity, and catch area, etc. as shown in Figure 6.22. This also applies to aquaculture products. In the case of lot consolidation or lot split, the original lot ID corresponding to the new lot should be recorded.

Traceability information on the fishery products is recorded and stored electronically to the market's database through the sales process. The labels, landing statements, sales notices and other documents are completed and issued electronically. Since the auction hall is the starting point for traceability, the ICT and IoT - based sales process at the first sale of the fishing harbour contributes greatly to the establishment of precise and efficient traceability information towards the end consumers.

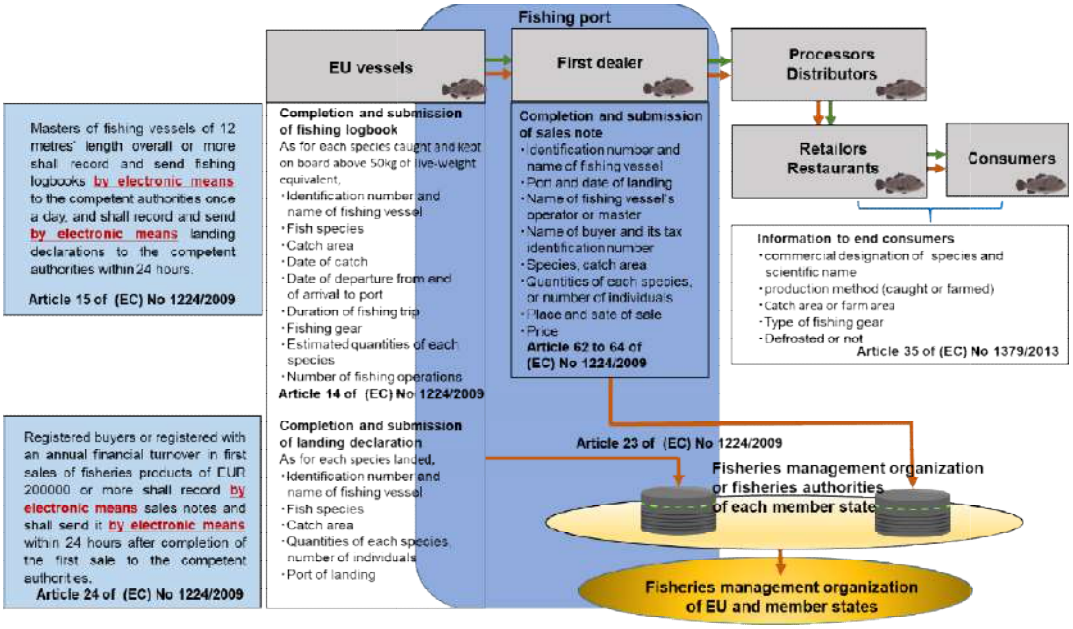


Figure 6.22 Recording, transmitting and displaying information on fish (fishery products)

6. PROJECT COMPONENTS

6.1 Construction of Breakwaters

6.1.1 TheAjanur fisheries village is spread over five wards of Ajanur Gram Panchayat and the construction of this breakwater will be a great relief for the fishermen families inAjanur as protection against high wave actions, adverse flow conditions near the entrance channel and wave breaking at low tides while manoeuvring their trawlers /boats.

6.1.2 This estimate is prepared for the construction of Breakwater at Ajanur, ChithariKadappuram. The major components are Northern Breakwater of 1150 m length, Southern breakwater of length (425 m).

6.1.3 5 kg to 20 kg category stones of approved quality is proposed for the filter layer. Core of the breakwater is proposed to be constructed using 20 to 50 kg and 20-100kg category stones. Stones of 50-100kg,100-200kg, 200-300kg,500kg-1T category are proposed for secondary armour,2 to 3T and 500kg-1T category stones for berm or scour protection and2T, 6T tetrapods at sea side at trunk portion and 8T tetrapods at round head is proposed. At the leeward side 500 kg-1 T and 1T-2T category stones are proposed category stones for the primary armour layer. Crest width of 6.0 m at trunk and9.0 m at head is provided.

6.1.4 Total cost for this component comes to**Rs.121,60,00,000**including 18 % GST.

6.2 Construction of River training work and dredgingnear the river training area

6.2.1 A river training work of Chithari River in the form of a beak water of length 432 m is proposed. River training work is proposed considering two major coastal processes: control of shitting and closing of Chittari River mouth due to sedimentation and southward littoral drift and littoral zone consideration.

6.2.2 5 kg to 20 kg category stones of approved quality is proposed for the filter layer. Core of the breakwater is proposed to be constructed using 20 to 50 kg and 20-100kg category stones. Stones of 50-100 kg,100-200 kg, 200-300 kg,500 kg-1 T category are proposed for secondary armour, 2 to 3 T and 500 kg-1 T category stones for berm or scour protection and 2T, 6T tetrapods at sea side at trunk portion and 8T tetrapods at round head is proposed. At the leeward side 500 kg-1T and 1T-2T category stones are proposed category stones for the primary

armour layer. Crest width of 6.0 m at trunk and 9.0 m at head is provided.

6.2.3 Dredging is proposed in between the north break water and river training work at the mouth of River Chithari on an average 100 m width and 350 m length. It is proposed to dredge the area to a level of -3.0m.

6.2.4 Total cost for this component comes to**Rs. 32,60,00,000**including 18 % GST.

6.3 Dredging and Construction of Reclamation Bund

6.3.1 Dredging is proposed in the basin channel having average width 130 m and length 510 m It is proposed to dredge the area to a level of -3.0m.

6.3.2 The reclamation bund is proposed to be constructed along the basin for a length of 400 m. The bund shall have geotextile (120 grams per sqm membrane) in two layers including joints by stitching for bund along the basin dry rubble masonry with good quality blasted rubble for protection wall along the basin and with specified grade of reinforced cement concrete 1:1.5:3 is proposed for protection wall.Beneath the geotextile layer a layer of 6 mm stones, 20 mm stones and a core of 10 to 20 kg stones are provided respectively. The reclamation bund along the basin has a base width of 400 cm and top width of 115.9 cm, and has a height of 550cm. Provision for 180 RCC guard pillars is given.

6.3.3 Total cost for this component comes to **Rs.6,24,00,000 including** 18 % GST.

6.4 Construction of Wharf and Auction hall

6.4.1 A 120 m long wharf with a width of 6.60 m for 60 m length and 5.00 m width for remaining 60 m length is provided for landing, berthing, and repair of fishing vessels. The beams and deck slab of wharf is proposed to be constructed of M-30 design mix using HCR reinforcement andM-35 bored cast-in-situ concrete piles of 750 mm diameter and 27.35m length is proposed as foundation for wharf. Facia wall of 1.5m depth is also provided.Wearing coat on deck slab is proposed using cement concrete 1:1.5:3 using 15mm broken stone for wharf.

6.4.2 Auction hall is ofsize 60 x 15 m is proposed on the rear side of the quay wall along landing area.The auction hall shall have RCC pile foundation with cast in situ concrete piles of M-35 grade, beams and slabs at floor level is made of M-30 design mix and with TMT bar of grade Fe-500D or more. 1.2 m long. Provision for column of size 40x 40 cm along with sloped roof of thickness 17.5 cm

supported on longitudinal and cross beams of grad M 25 are provided. Provision for centering and shuttering, all cement plastering of mix 1:3, first quality ceramic glazed wall tiles for auction hall columns, industrial floor tiles,all painting works of required shade etc. also included in this proposal.

6.4.3 Total cost for this component comes to **Rs. 5,91,00,000** incl. 18 % GST.

6.5 Construction of Canteen, Rest shed, Locker room and Gear shed

6.5.1 Atwo-storied building of overall size 45 m x 10 m is proposed to accommodate net mending shed, shops and locker room in ground floor and canteen and rest rooms in the first floor. Net mending shed of size 23.2 m x 10 m is proposed in the ground floor. 5 locker rooms and 5 shop rooms of size 3.10m x 3.50 m size is proposed in the ground floor. A canteen of size 23.2 m x 10 m is proposed in the first floor along with 10 rest rooms of size 3.10m x 3.40 m. Head room of height 300cm is proposed.

6.5.2 The building shall have concrete isolatedcolumn footingover coconut piling work and rubble packing.PCC bed of nominal mix 1:4:8 is to be provided for walls, beams, floors etc. RCC belt is provided for long and cross walls. Random rubble masonry with hard stone is proposed upto plinth level and superstructure shall be of solid block masonry using pre cast solid blocks. RCC of nominal mix 1:1.5:3 for footing and plinth beam. RCC of nominal mix 1:1.5:3 for columns.RCC of nominal mix 1:1.5:3 for beams, roofs, lintel, and sunshade works, in ground and first floor.Fe 500-D and above grades steel is used in RCC works upto plinth level and upto floor five level. Rolling shutters of approved make is proposed for all rooms of first floor and stair room. Teak wood work is proposed forframes of doors and windows. Vitrified floor tiles in different sizes is proposed for flooring works in shop room, locker room, veranda, canteen, rooms and textured industrial 12mm thick floor tiles offirst qualityis proposed for flooring works in net mending shed. Provisions for centering and shuttering,plastering works, all painting works is also included in this proposal.

6.5.3 Total cost for this component comes to **Rs. 2,49,00,000**incl. 18 % GST.

6.6 Construction of Compound Wall and Side Protection Works

6.6.1 The compound wall is proposed to be constructed of laterite masonry with neatly dressed laterite stone of size 30x20x20cm. RR masonry of hard stone is proposed

for foundation. The side protection works shall have foundation with coconut piling workwith 30 cm thick and 80 cm wide dry rubble masonry above it.Superstructure shall be of gabion structure with mechanically woven double twisted hexagonal shaped wire mesh gabion boxes along with geo-textile filter between pitching and embankment slopes, to prevent escape of the embankment material through the voids of the stone pitching.

6.6.2 Nominal mix CC-1:3:6 is proposed uptoplinth level and CC-1:2:4 above plinth level for compound wall and as belt over protection work along with guard pillar.TMT bars of grade 500-D and above provided as steel reinforcement for works upto plinth level. Provision for excavation, 12 mm cement plastering, water thinnable cement primer and finishing walls with water proofing cement paint of required shade are also included in this proposal.

6.6.3 Total cost for this component comes to **Rs.6,14,00,000**including 18 % GST.

6.7 Gate and Gate House

6.7.1 To provide security to the harbour area and to facilitate toll collection it is proposed to construct a gatehouse. The gate house is proposed to accommodate toll booth and ATM counter of size 2.4 x2.4 m each. The gate is supported by two main pillars (0.9x0.3m) and the top portion is decorated by providing pergola which is made up of four long beams and five cross beams. Also the pergolas are covered by UV stabilised fibre glass reinforced plastic sheet for protection against harsh sun rays. The main gate of length 7m and two wicket gates of 0.9mon either side in steel are also proposed. Both the toll booth and ATM counter is provided with sloped roof. The column footing is proposed for main pillars.

6.7.2 PCC concrete of nominal mix 1:4:8 is proposed for works upto plinth level, dry stone packing with good quality blasted rubble is provided under foundation for pillars, walls and steps. RR masonry with hard stones is used in foundation and plinth. Solid block masonry using pre cast solid blocks of size 30x20x20 cm are to be used for gate house walls upto floor two level with 1:6 CM. RCC M30 mix is proposed for all components above plinth level and for column footing of gate house.TMT bars of grade Fe 500D or more used as steel reinforcement for R.C.C works for columns, lintel, roof slab and pergolas

6.7.3 Total cost for this component comes to **Rs.1,80,00,00**including 18 % GST

6.8 Construction of Internal Road, Parking Area and Drainage facility

6.8.1 A 4 m two-way internal road system is proposed to accommodate various type of vehicle entering and leaving the fishery harbour. The internal road is proposed to be made of MSS type A Bitumen S-65.Well graded GSB and WMM layer of 15 cm thickness is proposed over well compacted original surface. Prime coat, tack coat and Mix Seal Surfacing of total thickness 20 mm, 4 m wide and 370 m long of required quality is applied on main road. 30cm wide concrete kerb of nominal mix 1:3:6 is provided for the main road. Laterite boulder masonry with hard departmental stone is proposed for construction of boundary wall of main road.Granular Sub-base with Well Graded Material of 23 m x 42 m for parking area and 4 m wide for main road with 15 cm thickness for both is provided. TMT bars are provided as steel reinforcement in foundation.

6.8.2 Total area of4320 sqm is proposed for parking. The proposed parking area is to be constructed with PCC and RCCM25 of thickness 10 cm and 15 cm respectively with side drains for drainage.A nominal mix CC of mix 1:3:6 for parking area, drainage bed and side walls, and median kerb of the main road is to be provided. The drain is proposed to be made with concrete PCC bed, side walls, cover slabsand 5 cm thick levelling course. Guard stone of 15 cm height is proposed on the side of drainage and parking areaat 2m centre to centre.

6.8.3 Total cost for this component comes to **Rs.2,82,00,000**including 18 % GST.

6.9 Toilet Block

6.9.1 Toilet block includes 4 w/c, counter room cum cloak room, courtyard, bath area and wash area. RR masonry is proposed in foundation with 0.15m thick PCC bed. Cement concrete flooring is to be provided. PCC bed of nominal mix is proposed for walls, beams, floors etc. RCC belt for long and cross walls is proposed.M30 grade RCC is proposed for lintels, beams, sunshade, staircase and roof. The building shall have concrete foundation, Random rubble masonry with hard stone upto plinth level and superstructure shall be of laterite masonry. Brick masonry manhole with RCC top and foundation is proposed.RCC roof slab of M30 mix is proposed.

6.9.2 Total cost for this component comes to**Rs. 25,00,000**including 18 % GST

6.10 Approach Road

6.10.1 The proposed road work involves 950m length with 5.5m in width. There exists a partially damaged road having average width of 4m. The road starts from KanhangadKadappuram road junction and ends at proposed Fishing Harbour. This is the only one approach road to the fishing harbour, hence this road is also proposed as BM and BC road. For the entire stretches, black topping is proposed after filling base course of 15 cm thick WMM. The sub base is prepared by compacting the original ground supporting the embankment. Black topping work includes prime coat, tack coat, 5 cm thick BM and 3cm thick BC.Provisions for loosening and compacting, clearing grass, shifting of utilities and land acquisition are included in the estimate.

6.10.2 Total cost for this component comes to**Rs. 1,38,00,000**including 18 % GST

6.11 Work shop building

6.11.1 This9.8m x 9.8m building which includes contains office room, shop, an electrical workshop, a mechanical workshop, a crane facility and a workspace is proposed. 0.15m thick and 2m wide PCC bed of 1:4:8 mix is proposed for wall and column foundations. Random rubble masonry with hard stone shall be used in wall foundation and plinth. DR packing under foundation with good quality blasted rubble is provided. TMT bars of grade Fe-500D or above is proposed for RCC works upto Plinth level. Plinth beam of 0.45m thickness is proposed. Superstructure shall be constructed of laterite masonry with neatly dressed laterite stone of size 40x20x15cm. RCC belt for long and cross walls, RCC for column and its footing and M30 RCC for lintel, roof slab, sunshade, stair, ground and first floor beams is proposed to be constructed.

6.11.2 Total amount of estimate comes to **Rs. 46,80,000**including 18 % GST.

6.12 Construction of office room cum harbour surveillance camera room

6.12.1 A twostorey building is proposed for office and harbour surveillance camera room having a plinth area of 299.2 m2. Ground floor contains office room, store room, rest room, 3 toilet, porch, entrance, stair room, and an open area for cabins. First floor contains an additional store room. It also includes provisions for a septic tank and soak pit. PCC bed of nominal mix is proposed for wall and

column foundations. Random rubble masonry with hard stone shall be used inwall foundation. Superstructure shall be constructed of laterite masonry with neatly dressed laterite stone of size 40x20x15cm. RCC belt for long and cross walls, RCC for column and its footing and RCC for lintel, roof slab, sunshade,stair, ground and first floor beams is proposed to be constructed with concrete of specified grades. Plastering shall be 12 mm cement plaster of mix:1:4 and 1:3 for ceiling and shall be finished with approved paints. Doors, windows andventilators shall be made of Aluminium. Glass panes shall be provided at the entrance, stair room and for office room for more provision of natural light.

6.12.2 Total amount of estimate comes to Rs. **89,00,000**including 18 % GST

6.13 Water supply arrangements in the harbour

6.13.1 Construction of a new O.H. RCC water tank and Sump for the Ajanur fishing harbour is planned for water supply having a capacity of 100000 litres. It has 60 cm diameter bored cast in situ pile foundation using RCC M 35 mix, lying below a 15 mm thick PCC layer of 1:4:8, a 75 cm thick M 30 RCC layer and 60 cm pedestal below GL successively. RCC columns of size 40X40 cm are provided and RCC water tank using M 30 mix at top in a frame supported by columns,beams and haunches. The beams are in three levels and are also proposed under the tank slab. An RCC cover slab is also proposed. Laterite masonry with neatly dressed laterite stones of size40x20x15 cm size is proposed for superstructure above plinth level upto floor 2 level. Steel ladders are proposed to provide access to the top for cleaning and maintenance functions. Plastering and suitable painting are also proposed.Provisions for distribution lines are also included. Masonry chamber as manhole is proposed. The construction of Pump House at bottom of the RCC tank is planned.

6.13.2 An RCC sump of 50000 litres capacity near the existing water tank is planned. The foundation of the sump is proposed over a dry rubble packing of 45 cm thickness. 15cm thick PCC 1:4:8 is proposed above it. It has an RCC bed slab of M30 grade. The base slab, 20 cm thickside wall and 15 cm thickcovering slab is proposed. Laying of pipe lines for pumping and distribution is planned. Two gates with GI tubes and painting its surface with epoxy painting is planned. Necessary pump set and electrification will be done.

6.13.3 Total amount of estimate comes to Rs. **1,89,00,000**including 18 % GST

6.14 Construction of Wharf for Berthing facility

6.14.1 A Berthing wharf of length 100 m and width 5m is proposed to be constructed near the south breakwater. The wharf is supported on 75cm diameter piles spaced at 6m effective span on length wise direction and 3.8 m effective span on transverse direction. Length of the proposed pile assumed as 27.35 m including 3.5m steel lining works. The deck slab of 20cm thickness is supported on longitudinal beams and cross beams of size 40x 80 cm. RCC M35 grade concrete is used for piles and M30 is used for beams slabs etc.

6.14.1 Total amount of estimate comes to Rs. **2,14,00,000** including 18 % GST

6.15 Effluent Treatment Plant

6.15.1 Lump sum provision of **Rs. 35.00 Lakh**is included in this estimate for construction of ETP.

6.16 Navigational Aid

6.16.1 Lump sum provision of **Rs. 2.00 Lakh** is included in this estimate to set up navigational aids in the harbour.

6.17 Pressure Washer and Cleaning Equipments

6.17.1 Lump sum provision of **Rs. 6.00 Lakh** is included for pressure washers, cleaning equipment, pump sets etc. All these were executed in various fishing harbours and the expenditure toward the same is included here.

6.18 Landscaping, Green Belt and Rainwater Harvesting

6.18.1 Lump sum provision of **Rs. 20.00 Lakh**is included in this estimate to set up facilities for landscaping, rainwater harvesting and green belt.

6.19 Mechanical conveyor system & Automation

6.19.1 Lump sum provision of **Rs. 150.00 Lakh** is included in this estimate to set up facilities for mechanical conveyor system &automation.

6.19.2 Electrification and Installation of Solar energy system

6.19.3 Lump sum provision of **Rs. 250.00 Lakh** is included in this estimate to set up facilities for electrification and Installation of Solar energy system

6.20 Cost Estimate

6.20.1 The cost estimate for the project has been worked out with the help of PRICE software. Rate analysis for such projects is included for HED in the software. The quantities of various items of work for breakwaters are calculated from the areas of cross sections of the structure plotted in AutoCAD. CPWD schedule of rates with current cost index for Kasargod District is adopted for the cost estimate.

6.20.2 The general abstract of cost estimate of the project is shown below. The detailed cost estimate is appended to this report

Table 6.1General Abstract of Cost

Sl No	Item	Quantity	Unit Rate in Rs	Amount in Rs
1	Construction of Breakwater at Ajanoor	1575m	772063.5	121,60,00,000
2	Construction of river training wall and and dredging near the river training area	Training wall-435m Dredging- 31000 m3		32,60,00,000
3	Dredging And Construction of reclamation Bund	Dredging - 132500 m3 Reclamation bund- 400 m		6,24,00,000
4	Wharf and Auction Hall	Wharf - 120 m x 6.6 m , Auction Hall - 60 m x 15m Total 1692m3	34929.1	5,91,00,000
5	Canteen, Rest shed, Locker room, Gear Shed	45 m x 10 m (two Storey)	27666.7	2,49,00,000
6	Compound wall and Side Protection Works	Compound wall- 510 m Side protection- 1710 m		6,14,00,000
7	Gate and Gate House	2.4 m x 2.4 m ATM and Toll Booth each (area 47.16m2)	38167.9	18,00,000
7	Internal Road, Parking area and Drainage facility	Parking Area - 4320 sqm	3873.6	2,82,00,000
		Internal Road - 740*4 m		
8	Toilet Block	13.3*5	37594.0	25,00,000
9	Construction of approach road to fishing harbour	950 m	14526.3	1,38,00,000
10	Construction of workshop building	9.8*9.8 m	48521.4	46,80,000
11	Construction of office room cum harbour surveillance camera room	14.6*22.6 m (2 storey)	26851.7	89,00,000
12	Construction of wharf for berthing facility	100*5 m	42800.0	2,14,00,000
15	OH Tank and Water Supply Arrangement	As per estimate		1,89,00,000
14	Effluent Treatment Plant	LS		35,00,000
17	Navigational Facility	LS		2,00,000
18	Pressure Washer and Cleaning equipments	LS		6,00,000
19	Landscaping, Green Belt and Rainwater Harvesting	LS		20,00,000

24	Mechanical conveyor system & Automation	LS	1,50,00,000
23	Electrification and Installation of Solar energy system	LS	2,50,00,000
		Total (A)including GST	**189,62,80,000**
Smart Infrastructure and automated systems			
30	Smart Technology Investments		
30.1	Procurement and installation of smart infrastructure components, such as IoT devices, sensors, communication networks, and data management systems including cost of hardware, software, and installation services.	LS	1,00,00,000
30.2	Development or customization of software for data management, analysis and visualization	LS	50,00,000
31	Communication and Connectivity		
31.1	Deployment of communication infrastructure, including internet connectivity, satellite communication systems, and wireless networks	LS	50,00,000
31.2	Implementation of networking equipment and cyber security measures	LS	50,00,000
32	Safety and Security Measures		
32.1	Investment in safety equipment (distress beacons and rescue drones)	LS	50,00,000
32.2	Installation of surveillance system including CCTV camera	LS	50,00,000
35	Provide charging stations for electric vehicles	L.S	10,00,000
36	Vehicle for installing IOT devices	L.S	35,00,000
		Sub total	**3,95,00,000**
		GST @ 18%	**71,10,000**
		Sub Total(B) including GST @ 18%	**4,66,10,000**
		Sub Total (C= A+B)	**194,28,90,000**
		Contingencies @ 3%	**5,71,10,000**
		Grand Total	**200,00,00,000**
Rupees Two hundred crore only			

6.21 Source of Fund

6.21.1 The project is proposed under PMMSY. As per guidelines, the funding will be shared between Centre and State in the ratio 60:40.The sunken costs of surveys, investigations and model studies have already been incurred by HED. Major partof the project management cost shall be met by the department and the work charged establishment proposed in the DPR is only for the additional technical man power required for implementing the project.

6.22 Procurement

6.22.1 The project shall be implemented by HED by the standard procurement procedure in force in the department. Upon obtaining administrative approval for the project, the proposal shall be studied in detail and subjected to technical sanction from the Chief Engineer who is delegated with the powers for projects of such value. Agency for execution of the work shall be selected by way of inviting e-tenders with Pre- Qualification system. The bids are subjected to scrutiny of prequalification committee to select qualified bids. The statutory tender committee selects the best offer to arrive at a contract.

6.23 Implementation Schedule

6.23.1 A detailed WBS and program of work shall be formulated on real time basis on scheduling software during the technical sanction procedure to finalize the baseline schedule. At present, it is estimated that a period of 48 months is required for the implementation of the work.

Implementation Schedule

Construction of Ajanur Fishing Harbour

Sl No	Stages of Implementation	Month																								
		1st	3rd	5th	7th	9th	11th	13th	15th	17th	19th	21st	23rd	25th	27th	29th	31st	33rd	35th	37th	39th	41st	43rd	45th	47th	48th
1	Technical Sanction and Tendering																									
2	Construction of Breakwater at Ajanoor																									
3	Construction of River training work and Dredging near the river training area																									
4	Dredging And Construction of reclamation Bund																									
5	Wharf and Auction Hall																									
6	Canteen ,Rest shed, Locker room,gear shed																									
7	Compound wall and side Protection works																									
8	Gate and Gate House																									
9	Construction of Wharf for Berthing Facility																									
10	Internal Road ,Parking area and Drainage facility																									
11	Sewage treatment Plant																									
12	Water Supply Arrangement																									
13	Electrification																									

6.24 Manpower Requirement and Capacity Building

6.24.1 HED has the necessary resources to carry out surveys, designs, estimation, scheduling, procurement and project implementation management. Each of the project location has a sub-divisional office headed by Assistant Executive Engineer to implement the project. The Divisional office at Kasargod headed by Executive Engineer and the North Circle office at Kozhikkode headed by Superintending Engineer shall be in charge of procurement, monitoring and control of the projects. Surveys and investigations are carried out by the HED Investigation & QC sub division, Vellayil.

6.24.2 The department has its offices and trained project resources to supervise the implementation of the project. The North Circle office at Kozhikkode will be doing the procurement process subjected to the approval of the tender committee. The division office in Kasargod District with the help of the Sub division offices shall be supervising the project execution and billing. Quality control is done looked after by the field office and monitored by the quality control subdivision. HED also has the change management system in place wherein any changes in scope, time and cost shall be regulated.

6.24.3 Thus, the department already possesses the required resources and expertise to carry out the project. The overhead on project formulation and management is borne by HED.

7. ECONOMIC EVALUATION

7.1 Cost-Benefit Analysis

7.1.1 Economic viability depends upon the sustainability of project effects. Projects are sustainable if their net benefits or positive effects endure as expected throughout the life of the project. Sustainability is enhanced if environmental effects are internalized, and if financial returns provide an adequate incentive for project related procedures and consumers. The concept of financial profit is not the same as economic profit. The financial analysis of a project estimates the profit accruing to the project-operating entity or to the project participants, whereas economic analysis measures the effect of the project on the national economy. For a project to be economically viable, it must be financially sustainable as well as economically efficient. If a project is not financially sustainable, economic benefits will not be realised. Financial analysis and economic analysis are therefore two sides of the same coin and are complementary.

7.1.2 Fishing harbours and related infrastructures created are primarily meant for poor fishermen communities in respective locations and any development in this sector can be considered to be a service oriented one rather than a commercial one. However, if an economic analysis is carried out for any fishery related infrastructure or the like, the cost benefit accrued will be highly promising.

7.1.3 On detailed analysis, the cost-benefit ratio of Ajanur fishing Harbour comes to 1.37. The detailed cost-benefit analysis is provided in the appendix. The intangible benefits such as increased safety of fishermen's life and property and general improvement in the overall working of the harbour is beyond a cost-benefit analysis and thus cannot be included. Considering the resources potential of the area, investment proposal of the project is found to be economically viable. The total project cost comes to Rs20,000 lakhs. The amount can be met from PMMSY scheme.

7.2 Project Risk Analysis

7.2.1 Risk identification, probability and impact of risks and risk response strategy are worked out to reduce negative risks and to harness positive risks. The risks identified and response strategy are listed below

Sl. No.	Risk	Positive/ Negative	Probability	Impact	Mitigation measure
1	Delay in statutory clearances	-ve	10%	Delay in commencement	Fast tracking of execution
2	Ban on mining during elections	-ve	25%	Delay in commissioning	Accept
3	Lack of competition in tenders	-ve	25%	Tender excess	Contingency reserve included in the cost
4	Hazards in execution in marine environment	-ve	10%	Delays	Risk transferred to contractor
5	Flood/ Hurricane	-ve	10%	Losses to structure	Accept the risk
6	Pandemics like COVID-19	-ve	10%	Delays	Accept the risk

8. CONCLUSION

8.1.1 The proposal for the development of a fishery harbour at Ajanur is presented in this report. The main component of the proposal is extension of two breakwaters and river training work to create permanent tranquil basin for the safe landing of vessels in all seasons. The other facilities included are construction of wharf, auction hall, internal roads, parking area, loading area, water supply, electrification, drainage and sanitation arrangements, dredging etc. This project is absolutely necessary for the social and financial improvement of fishermen folk living in and around the proposed site. The total estimated cost for this project comes to Rs. 20000 lakh.This harbour construction will contribute to the socio-economic uplift of the area especially the downtrodden fishermen community and also provide employment to thousands of people both directly and indirectly. Considering the resource potential of the area and investment proposed, the project is found to be economically viable. The State Government requests the Government of India to sanction financial assistance for implementation of construction of Fishing Harbours under PMMSY.

WHARF LENGTH CALCULATION

Landing, Outfitting, Repair and Berthing lengths

After considering the current fleet size operating from this area, the design fleet size of this harbour is arrived - motorised non- mechanical vessels - 553 Nos of 15m (avg length), motorised mechanical vessels -50 nos of 10 m (avg length) and traditional boats (non-motorised) - 30 nos of 8 m (avg length)

Of this, landing quay facilities are to be created for the MFVs, non MFVs and traditional vessels. Additional wharf lengths may be provided for landing, berthing and outfitting facilities for the MFVs, non MFVs and traditional vessels. The number of boats, length, annual average landing, etc. is given below in the statement form.

Overal vessel length (m)	Number of vessels	Fishing trips (days)	Fishing trips per year	Average daily landing
8	30	1	220	60
10	50	1	150	800
15	553	1	44	1136

The following assumptions are made while calculating the length of landing quays.

• At any time, 10% of the totals fishing fleet are not fishing due to maintenance, repair or any other reason.

• The vessels that go on 5 days trip will be equally distributed on each with same number of departures/ arrivals.

• Duration of fish landing hours in the fishery harbour will be 6 hours.

• An unloading rate of 4500kg/hour is assumed considering that the fish will be unloaded in fish baskets/boxes manually.

• During the peak month of the fishing season, some boats are expected to arrive with additional fish catch. Though this larger catch is expected to arrive only on a few days during the peak season, it has been safely assumed that daily on an average, 40% of the 8m vessels arrive in the peak hour with 20% additional fish catch, 20% of the 10 m vessels will arrive with additional 15 % increase in the fish catch. and 30% of the 15 m vessels will arrive with additional 10% increase in the fish catch.

Landing length for 15 m vessels: No landing length required as carrier vessels bring the catch to land.

Landing Length for 10 m Vessels on wharf				
Number of Vessels considered		=	50	
Number of boats operating per day (90%)	0.90x50	=	45	
Number of boats arriving in an hour (20%)	0.20x45	=	9	
Average fish landing / boat		=	800	kg
Peak landing per boat (+20%)	1.20x800	=	960	kg
Time required for unloading @4500/hr	960 x 60 / 4500	=	13	minutes
Time required for docking and undocking	2+2	=	4	minutes

Total time required	4+13	=	17	minutes
Number of berths required to handle 8 vessels in one hour	9x17/60	=	3	Nos
Landing quay length required	3(10+1)	=	28	metre

Landing Length for 8 m Vessels on wharf				
Number of Vessels considered		=	30	
Number of boats operating per day (90%)	0.90x30	=	27	
Number of boats arriving in an hour (40%)	0.40x27	=	11	
Average fish landing/ boat		=	60	kg
Peak landing per boat (+20%)	1.20x60	=	72	kg
Time required for unloading @4500/hr	60x72/4500	=	1	minutes
Time required for docking and undocking	2+2	=	4	minutes
Total time required	4+1	=	5	minutes
Number of berths required to handle 140 vessels in one hour	11x5/60	=	1	Nos
Landing quay length required	1(8+1)	=	8	metre

Outfitting Length for 8 m Vessels

Number of boats requiring outfitting in a peak season per day	0.90x30	=	27	
Time required for each boat to receive fuel water and ice		=	10	minutes
Duration of outfitting hours		=	8	hours
Number of berths required for Outfitting	27x10/8x60	=	1	
Length of Outfitting required	1(8+1)	=	5	metre

Outfitting Length for 10 m Vessels

Number of boats requiring outfitting in a peak season per day	0.90 x50	=	45	
Time required for each boat to receive fuel water and ice		=	10	minutes
Duration of outfitting hours		=	8	hours
Number of berths required for Outfitting	45x10/8x60	=	1	
Length of Outfitting required	1(10+1)	=	11	metre

Outfitting Length for 15 m Vessels

Number of boats requiring outfitting in a peak season per day	(0.90*553) / 5	=	100	
Time required for each boat to receive fuel water and ice		=	10	minutes
Duration of outfitting hours		=	8	hours
Number of berths required for Outfitting	(100x10)/(8x60)	=	2	
Length of Outfitting required	2(15+1)	=	33	metre

Berthing Length

Berthing length is provided for idle berthing of 20% of vessels after unloading their catch and before proceeding on a fishing trip. The remaining vessels can anchor innside the river for idle berthing during fair season. The vessels are assume to berth four abreast while idel berthing)

Berthing Length for 8 m Vessels

Berthing is provided for 20 % of vessels	0.20x30	=	6	
Assuming vessels berth 4 abreast. Number of berth required		=	2	
Landing berth available		=	1	
Outfitting berth available		=	1	
Number of berth to be provided	2-(1+1)	=	0	
Berthing required for 8 m vessels	0x(8+1)	=	0	metre

Berthing Length for 10 m Vessels

Berthing is provided for 20 % of vessels	0.20x50	=	10	
Assuming vessels berth 4 abreast. Number of berth required		=	3	
Landing berth available		=	3	
Outfitting berth available		=	1	
Number of berth to be provided	3-(3+1)	=	0	
Berthing required for 10 m vessels	0x(10+1)	=	0	metre

Berthing Length for 15 m Vessels

Berthing is provided for 20 % of vessels	0.20x553	=	111	
Assuming vessels berth 4 abreast. Number of berth required		=	28	
Landing berth available		=	0	metre
Outfitting berth available		=	2	metre
Number of berth to be provided	28-(0+2)	=	26	
Berthing required for 6 m vessels	26x(15+1)	=	409	metre

Repair length

Provide repair quay of 1 boat length

8 m vessel	8+1	=	9	metre
10 m vessel	10+1	=	11	metre
15 m vessel	15+1	=	16	metre

Summary of waterfront length required					
Overall length of Vessels (m)	Landing length (m)	Outfitting length (m)	Berthing length (m)	Repair length (m)	Total length (m)
As per calculation					
8	8	5	0	9	22
10	28	11	0	11	50
15	0	33	409	16	458
Total					**530**

Annexure 17.2 of Harbour& Coastal Engineering (Indian Scenario): Vol.II of C.T.BETGERI, Deputy Director Central Institute of Coastal Engineering for Fisheries, Bangalore India.

530 m wharf is required in the harbour. In the first phase a wharf length of 220m is proposed

COST BENEFIT ANALYSIS

Construction of Ajanur Fishing Harbour						
Cost Benefit Analysis						
The fish landings and toll revenue should be accounted for the original investment of constructing the harbour. But special investment is required to make the harbour operational throughout the year and this will gain 30 additional fishing days for the harbour. The amount for this comes to 30x500000 = 150 Lakhs per year. As the original cost is also taken for cost benefit analysis, a total of 300 fishing days is taken for the benefit calculations						
PROJECT COST						
Year	**Expansion of Ajanur Fishing Harbour**	**Quantity**	**Unit**	**Rate /Unit in Lakh Rs**	**Cost in Lakh Rs.**	**PV**
0	First Year amount				8000.00	8000
1	Balance works year 2				8000.00	7273
2	Balance works year 3				4000.00	3306
3						
4						
5	Replenishment / Maintenance of harbour @ 2.0% of construction cost / 5 yrs				400.00	248
6						
7						
8						
9						
10	Replenishment / Maintenance of harbour @ 2.0% of construction cost / 5 yrs				400.00	154
11						
12						
13						
14						
15	Replenishment / Maintenance of harbour @ 2.0% of construction cost / 5 yrs				400.00	96
	Total				**21200.00**	**19076.86**

PROJECT BENEFITS						
Year	**Expansion of Muthalapozhy Fishing Harbour**	**Quantity**	**Unit**	**Rate /Unit Lakh Rs**	**Cost in Lakh Rs.**	**PV**
1	Nil					
2	Nil					
3	Fuel savings, 633 boats, (5Lx300daysxRs.120/L)	633	Nos	1.8	1139.40	856
3	Savings on Road transportation of fishermen and gears, 633 boats, van charges Rs1500/day x 300days	633	Nos	4.5	2848.50	2140
3	Time value saving on catch	633	Nos	0.5	316.50	238
3	Additional Fish Landings	30	Days	5	150.00	113
3	Toll/user charges	30	Days	0.333	9.99	8
4	Savings on fuel, transportation, time, fish landings and toll added together for 4th year				4464.39	3049
5	=Do=				4464.39	2772
6	=Do=				4464.39	2520
7	=Do=				4464.39	2291
8	=Do=				4464.39	2083
9	=Do=				4464.39	1893
10	=Do=				4464.39	1721
11	=Do=				4464.39	1565
12	=Do=				4464.39	1422
13	=Do=				4464.39	1293
14	=Do=				4464.39	1176
15	=Do=				4464.39	1069
	Total				**58037.07**	**26208**
					NPV=	7132
					B/C=	**1.37**

BORE HOLE DETAILS

BORE LOG

PROJECT : General investigation work for the proposed Ajanur Fishery Harbour
LOCATION : Kanhangad Harbour
CLIENT : Executive Engineer, Harbour Engineering Division, Kasargod

BORE HOLE NO :6
TYPE OF BORING : Rotary Drilling
DATE OF START : 28/12/2022
DATE OF FINISH : 29/12/2022

WATER TABLE LEVEL (From GL):	1.70 m	SAMPLES	
RL :		SPT :	14
TERMINATION DEPTH :	25.75 m	DS :	13

Depth (m)	Soil Profile	Description of the soil	Thickness of Layers (m)	Standard penetration test data					Graphical representation of 'N' value	Remarks
				Depth (m)	15	30	45	N		
0		Ordinary Sand Soil	0.4	0.00					0 15 30 45 60	
0.4		Sand	10	1.50	5	8	13	21		
				3.00	13	14	14	28		
				4.50	15	28	22	>50		Balance- 2 cm
				6.00	18	31	19	>50		Balance- 4 cm
				7.50	25	>50	-	>50		Balance- 17 cm
				9.00	10	13	18	31		
10.4		Clay	7.5	10.50	1	1	1	2		
				12.00	1	1	2	3		
				13.50	1	1	1	2		
				15.00	1	2	1	3		
17.9		Stiff Clay	5.7	18.00	12	14	18	32		
				21.00	12	19	27	46		
23.6		Silty Weathered	2.15	24.00	18	31	19	>50		Balance- 5 cm
25.75				SPT Rebounded at 25.75m						No Sample

Bore Hole terminated at 25.75 m

Asst.Engineer

Asst. Exe. Engineer

MODEL STUDY REPORT

भारत सरकार / Government of India
जल शक्ति मंत्रालय / Ministry of Jal Shakti
जल संसाधन, नदी विकास और गंगा संरक्षण विभाग
Department of Water Resources, River Development and Ganga Rejuvenation
केन्द्रीय जल और विद्युत अनुसंधान शाला
खडकवासला, पुणे – 411 024
CENTRAL WATER & POWER RESEARCH STATION
Khadakwasla, Pune – 411024

MATHEMATICAL MODELLING FOR COASTAL ENGINEERING DIVISION
(Coastal and Offshore Engineering Laboratory)

TECHNICAL REPORT No.: 6283
July 2024

मछली पकड़ने के बंदरगाह के निर्माण के कारण जल-गत्यात्मकता और गाद का आकलन करने के लिए गणितीय प्रतिमान अध्ययन अजनूर, केरल

MATHEMATICAL MODEL STUDIES TO ASSESS HYDRODYNAMICS AND SILTATION DUE TO CONSTRUCTION OF FISHING HARBOUR AT AJANUR, KERALA

Dr. R. S. Kankara
Director

REPORT DOCUMENTATION SHEET

Technical Report No. 6283 **Date: July 2024**

Title: MATHEMATICAL MODEL STUDIES TO ASSESS HYDRODYNAMICS AND SILTATION DUE TO CONSTRUCTION OF FISHING HARBOUR AT AJANUR, KERALA

Officers Responsible for Conducting the Studies

The studies were conducted by Boora Krishna, Scientist 'B', Dr. Naren Scientist 'B' and Naval Jagatap, Scientist 'B' under the supervision of Dr. Jiweshwar Sinha, Scientist 'E' and Dr. Prabhat Chandra, Additional Director and overall supervision of Dr. R. S. Kankara, Director, CWPRS, Pune.

Name and Address of Organization Conducting the Studies

Mathematical Modelling for Coastal Engineering Division
Central Water and Power Research Station, Pune - 411 024

Name and Address of Authority Sponsoring the Studies

Chief Engineer,
Harbour Engineering Department (HED),
Kamaleshwaram, Manacaud - P.O, Thiruvanathapuram – 695 009

Synopsis

Mathematical model studies to assess hydrodynamics and sedimentation aspects for the proposed development of fishing harbour at Ajanur was referred to CWPRS by Chief Engineer, HED, Kerala. The model simulations for hydrodynamics and sedimentation were carried out for the existing and the proposed condition.

As per the wave and littoral drift simulation results the proposed layout having 1150m long north breakwater, 425m long south breakwater, 435m breakwater as a river training work was studied for hydrodynamics and siltation point of view. Further, dredging upto -2m in the approach channel of the Chittari river mouth with appropriate dredging along the river was incorporated in the model. Also, dredging upto -4m in the harbour basin was considered in the hydrodynamic model simulations. The model results revealed that the annual sedimentation i.e. depth of deposition for the proposed condition in the harbour basin would be about 0.03m per year whereas depth of deposition at the river mouth would be about 0.045m in a year. A reduction in current speed due to the proposed development in the channel i.e. dredging of the channel up to -2m as well as in the proposed harbour basin would cause the loss of depth in the site. Further, an annual sedimentation of about 0.05m along the north and south of the breakwaters is also observed from the model results. Based on the model results, the proposed layout of the training works and the harbour basin is found to be suitable with the prevailing conditions at the site.

Key Words: Mathematical Model, Breakwater, Current, Sedimentation, MIKE 21

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MATHEMATICAL MODEL STUDIES TO ASSESS HYDRODYNAMICS AND SILTATION DUE TO CONSTRUCTION OF FISHING HARBOUR AT AJANUR, KERALA

Technical Report No.:6283	**DATE: July 2024**

1.0 INTRODUCTION

Harbour Engineering Department (HED), Government of Kerala proposed to develop a fishing harbour at Ajanur situated about 15km south of Kasaragod district. Ajanur fishing harbour is located geographically at Latitude 12.33^0 N and Longitude 75.18^0 E in Kerala state on the western coast of India. Fig. 1 shows the location map of Ajanur fishing harbour.

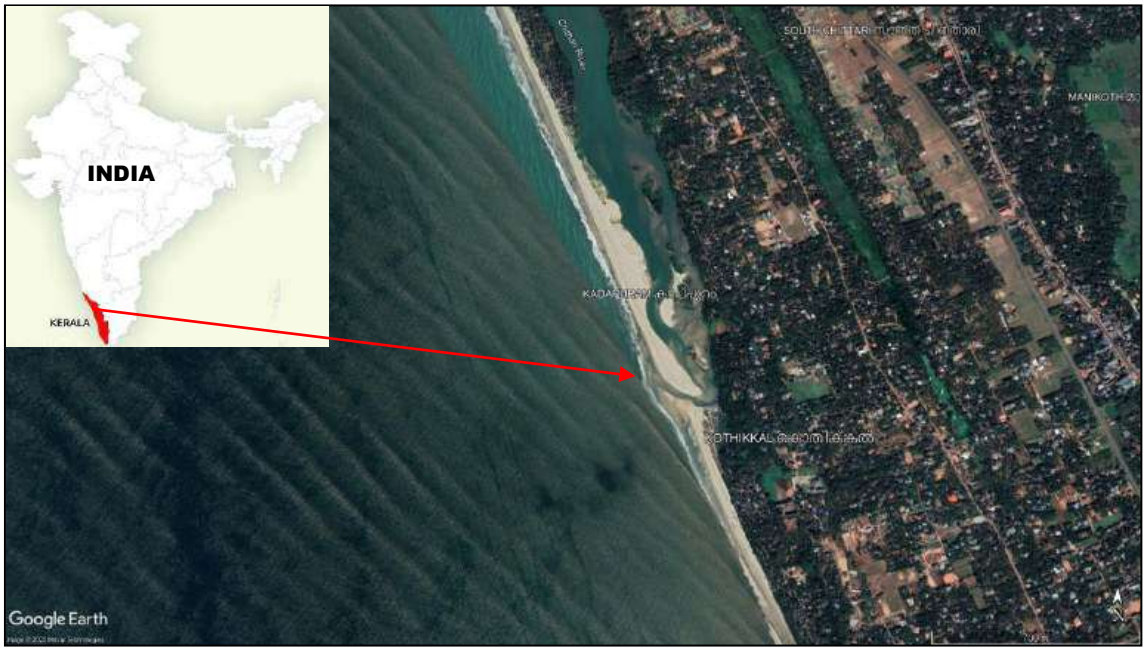


Figure 1: Location of Site at Ajanur

CWPRS carried out wave model studies on the same study area in the year 2016. These studies proposed one final layout of fishing harbour. As per the CWPRS 2016 report vide T. R. No. 5436, Nov 2016, the harbour basin area is about 19 hectares. Considering the future expansion as suggested by the Technical Sanction Committee of Pradhan Mantri Matsya Sampada Yojana (PMMSY) scheme vide HED Letter No. D4/9509/06/CE dated 16-06-2022, HED proposed a revised layout of the Ajanur fishing harbour. The revised layout consists of 1150m long north breakwater, 425m long south breakwater and 435m breakwater as a river training work near the mouth of Chittari river. River training work is proposed in the present layout considering two major coastal processes: - (i) control of shifting and closing of Chittari River mouth due to sedimentation (ii) Southward littoral drift and littoral zone consideration (from CWPRS study T. R. No 5357 Feb 2016). The revised layout is shown in Fig. 2.

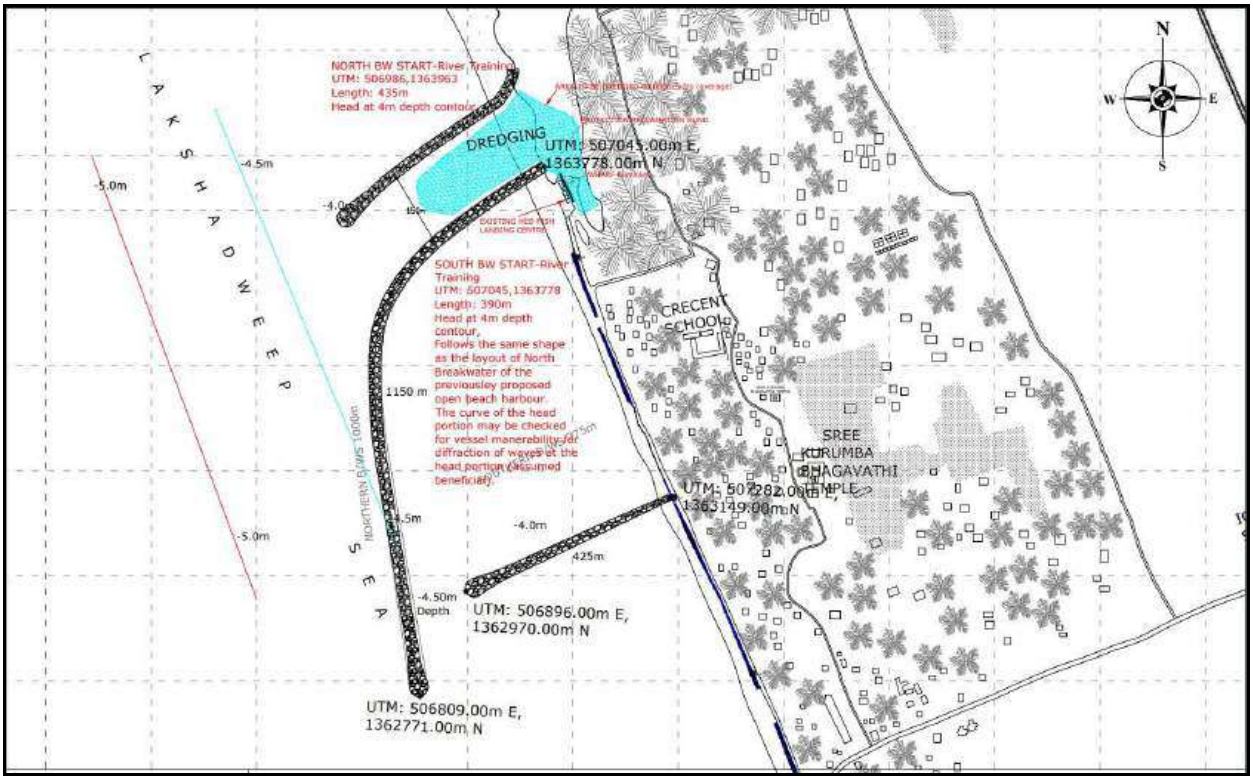


Figure 2: Proposed Layout at Ajanur

2.0 SCOPE OF STUDIES

Mathematical model studies to assess the hydrodynamics and siltation due to the proposed construction of fishing harbour are undertaken.

Following are the objectives of the present studies:

(i) To study the hydrodynamics and siltation with the existing condition.

(ii) To study the changes in hydrodynamics and siltation with the proposed condition wherein fishing harbour layout and river training work are included.

3.0 DATA ANALYSIS

The data required for the model studies are bathymetry of the area, tidal data, grain size distribution, suspended sediment concentration, river discharge, if any etc. HED, Kerala, the Project Authority (PA) has conducted field survey to collect the aforementioned data during March 2023. Earlier, PA conducted survey to collect the data in the year 2022 (1st June to 7th June). After examining the data, it was found that the data was not appropriate for numerical modelling. Hence, a re-survey for collecting the data were conducted by PA between 15th March to 20th March 2023. The data is collected both in river region (Lat:12.347, Lon 75.062) and in offshore region (Lat: 12.334 Lon: 75.0611). Henceforth, in this report these two points are called as P1 and P2 respectively as per Fig. 3. The details of the data collected are discussed below.

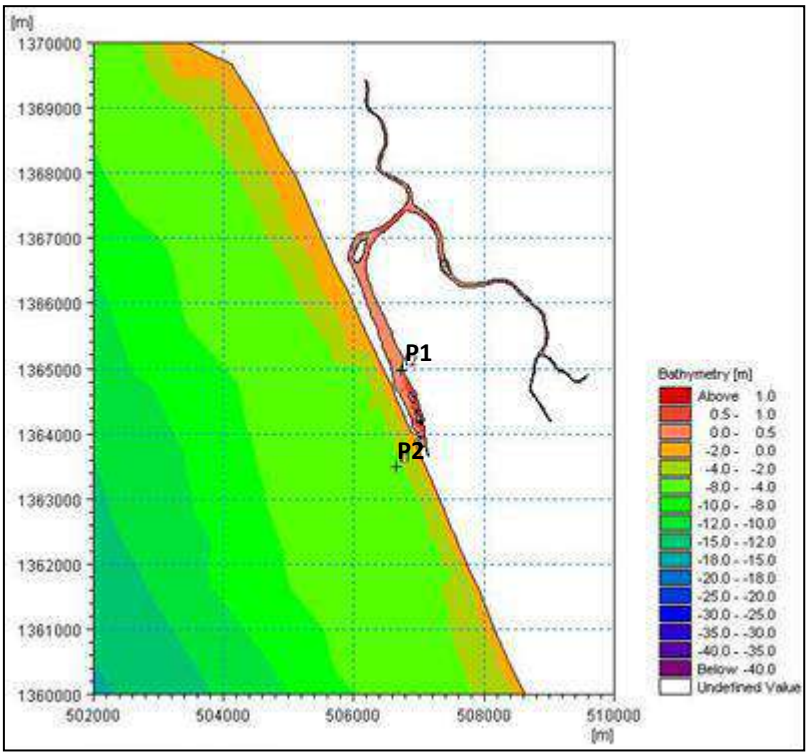


Figure 3: Field data collection points

3.1 Bathymetry

The bathymetric data for offshore shore region is obtained from C-MAP data. The nearshore bathymetry data is obtained from the hydrographic charts supplied by PA. The Acoustic Doppler Current Profiler (ADCP) of CWPRS is used to obtain the data of water level depth over the estuary and river region. The water level depth measurements are further used to estimate the bathymetry. The estimated bathymetry used in this study is shown in Fig 4.

3.2 Tides

Tidal data is collected from 15th March 2023 to 20th March 2023 at two different locations i.e., river (P1: Lat:12.347, Lon 75.062) and over sea region (P2: Lat: 12.334 Lon: 75.0611) as mentioned above. The tide data obtained at P1 and P2 w.r.t Mean Sea Level (MSL) is shown in Fig. 5. The MSL at Ajanur is 0.98m. It is observed that the spring tide tidal range (Global Tide) is about 1.30m. It is observed from the plot that tidal data at P1 is almost continuous with few missing values. However, the data at P2 is discontinuous not following usual tidal trends.

3.3 Tidal Currents

Field observed current data collected at locations P1 and P2 during March 2023 is shown in Fig 6. It is observed that the current data at both P1 and P2 shows numerous spikes at different time steps. Tide and currents data find importance in the study for calibrating the model**.**

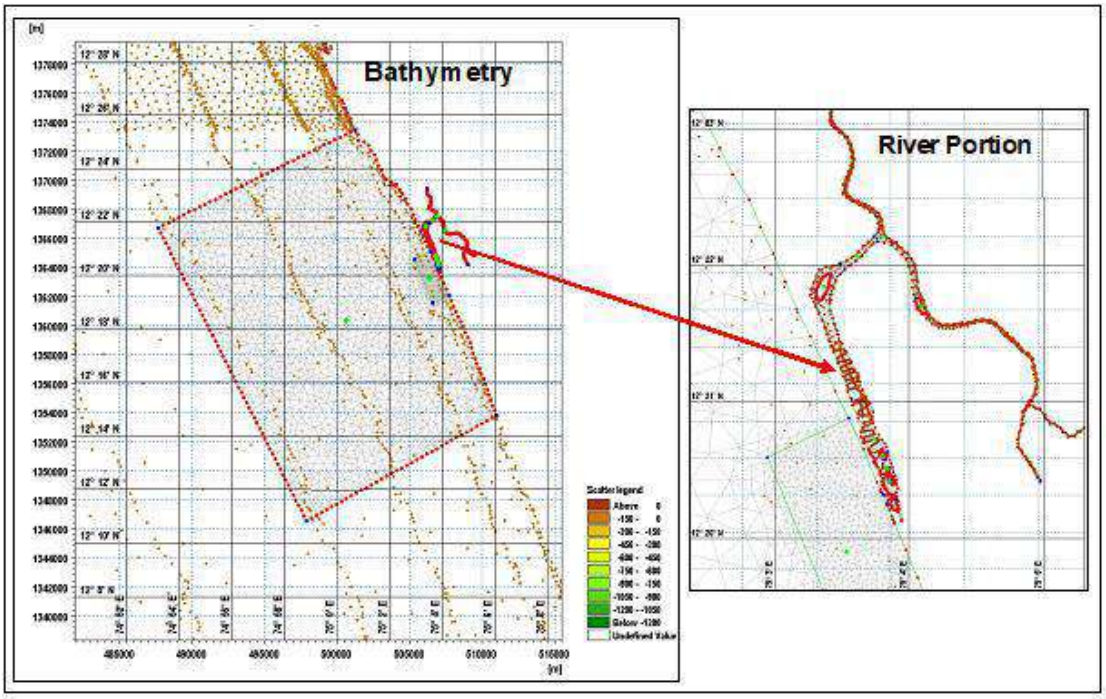


Figure 4: Bathymetry data

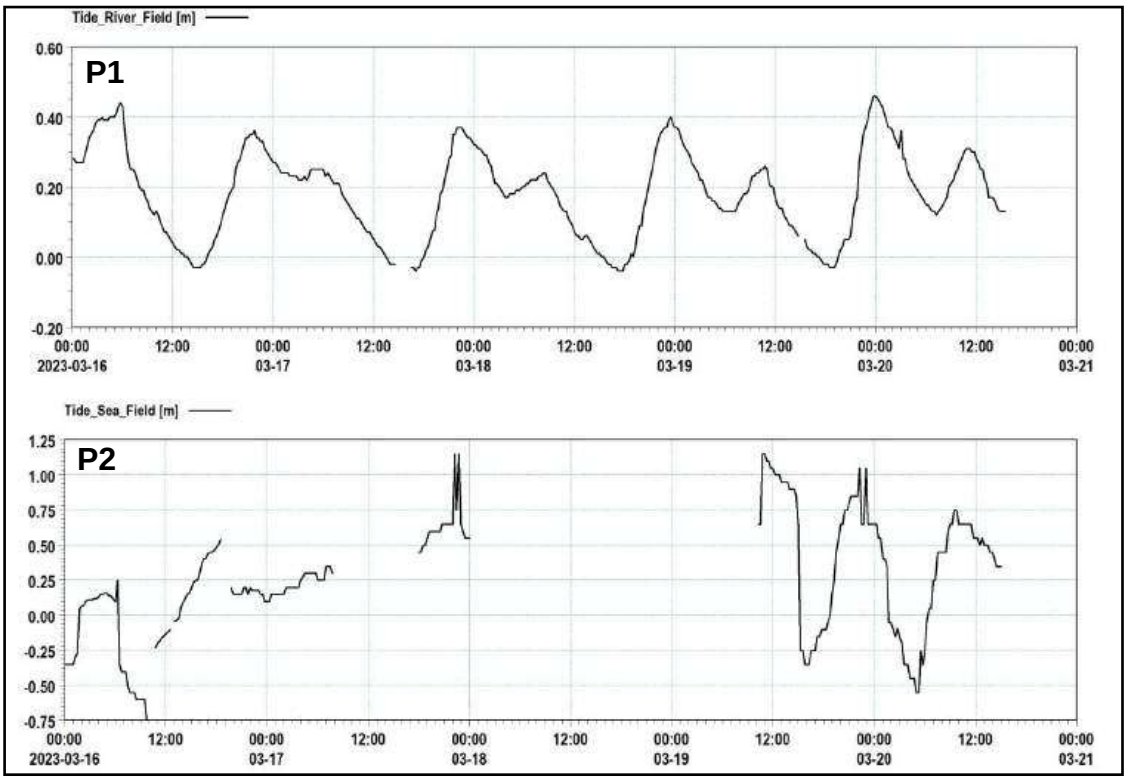


Figure 5: Observed tides at P1 and P2

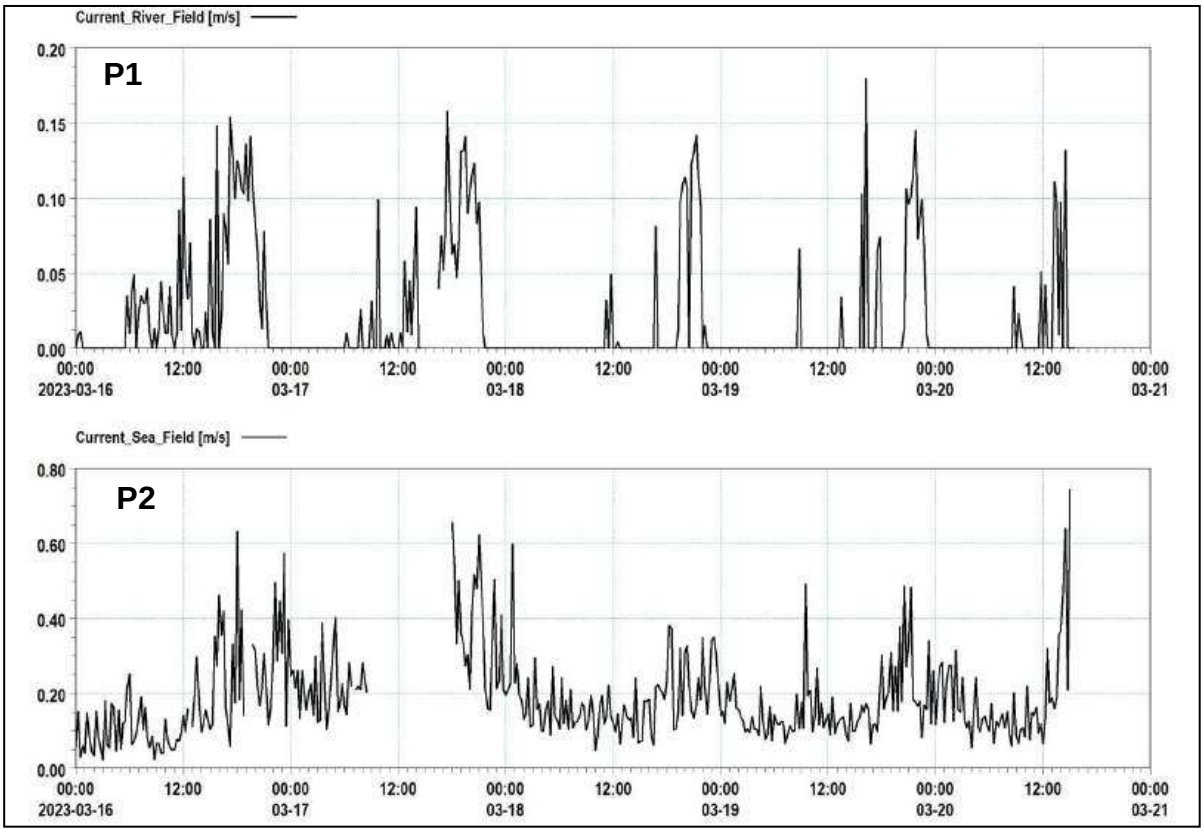


Figure 6: Observed current at P1 and P2

3.4 Sediment Data

The sediment data is collected and supplied by HED which comprised of the bed sample taken in the year 2022. The average D_{50} is 0.064mm in sea and D_{50} in river is 0.210mm.The grain size distribution at P1 and P2 is shown in Fig. 7. Water samples are collected at river and sea point (P1 and P2) during March 2023 to estimate the Suspended Sediment Concentration (SSC). From the data it is observed that SSC varies at P1 from 0.1mg/l to 0.15mg/l. Whereas, variation of SSC is between 0.05mg/l to 0.11mg/l at P2. The average suspended sediment concentration (SSC) in is 0.210mg/l and 0.08mg/l at P1 and P2 respectively. These average values of SSC are used for modelling.

3.5 Discharge Data

The river discharge is also a required parameter for calibrating the model. The river Chittari is a non-perennial river having variation in discharge during monsoon and non-monsoon seasons. As per HED, the river carries minimal discharge during monsoon and almost no discharge during the non-monsoon season. During the time period of field data collection, discharge in the river is only due to influence of tidal fluxes. The river discharge of 6 m^3/s is obtained through river ADCP observations is considered for non-monsoon season and for monsoon season, 25 m^3/s discharge is considered for modelling.



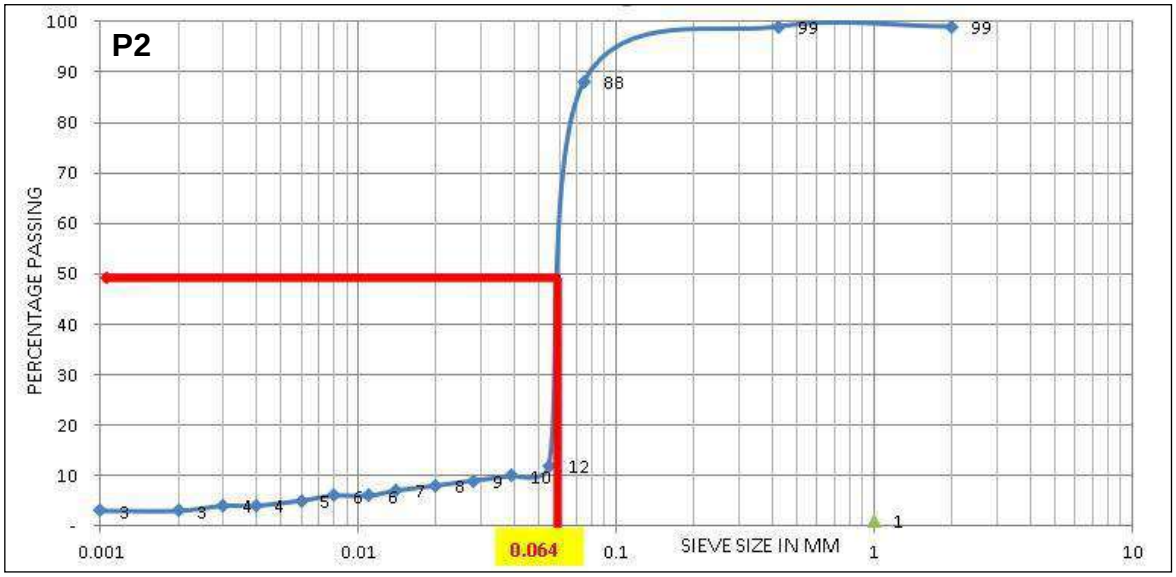


Figure 7: Grain size distribution at P1 and P2

Table 1: Details of suspended sediments concentration at P1 and P2

P1				P2			
Sample no.	Date	Time	Suspended solids in mg/l	Sample no.	Date	Time	Suspended solids in mg/l
W1	15/03/2023	7.00pm	0.12	W1	15/03/2023	10.30am	0.07
W1	16/03/2023	8.00 am	0.13	W2	15/03/2023	7.45pm	0.06
W2	16/03/2023	2.00pm	0.1	W1	16/03/2023	3.00pm	0.07
W3	16/03/2023	8.00pm	0.11	W1	17/03/2023	8.00am	0.07
W1	17/03/2023	8.00am	0.14	W2	17/03/2023	8.15pm	0.07
W2	17/03/2023	2.00pm	0.15	W3	17/03/2023	2.00pm	0.11
W3	17/03/2023	8.00pm	0.11	W4	17/03/2023	2.30pm	0.11
W1	18/03/2023	8.00am	0.13	W5	17/03/2023	8.00pm	0.09
W2	18/03/2023	2.00pm	0.11	W1	18/03/2023	8.00am	0.06
W3	18/03/2023	7.00pm	0.13	W2	18/03/2023	1.30pm	0.08
W1	19/03/2023	8.00am	0.1	W3	18/03/2023	9.00pm	0.05
W2	19/03/2023	2.00pm	0.12	W1	19/03/2023	8.00am	0.08
W3	19/03/2023	8.00pm	0.1	W2	19/03/2023	3.00pm	0.1
W1	20/03/2023	7.00am	0.11	W1	20/03/2023	8.30am	0.09
W2	20/03/2023	2.00pm	0.1	W2	20/03/2023	1.00pm	0.07

4.0 METHODOLOGY

The mathematical model studies are carried out using MIKE 21 software using the Flexible Mesh. The flexible mesh is considered as suitable for creeks with meandering coastline. The hydrodynamic studies include simulation of the flow field for the following conditions: -

1. Calibration of the model with the existing site conditions of the year 2023.
2. In the proposed condition, the layout as shown in Fig. 2 is studied for assessment of changes in the hydrodynamics and sedimentation.

The model run to evaluate hydrodynamics would be calibrated with the observed field data along with wave induced currents (radiation stresses) from wave model studies. The calibrated model will be used to predict the changes in the flow pattern for the proposed condition. The results of the above hydrodynamic studies are used as basic input for the sediment transport studies.

Model studies are carried out by coupling the flow models with sedimentation models to predict the evolving changes in sedimentation pattern. The results of these studies show the spatially varying pattern of siltation and erosion. The simulation of hydrodynamics and sedimentation (for existing and proposed condition) is separately performed for monsoon and non-monsoon seasons. The comprehensive detail of the hydrodynamics, wave and siltation studies for both existing and proposed condition is useful information for the coastal population and also the policy makers.

5.0 DESCRIPTION OF MODULES OF MIKE 21 FM

The 2-dimensional hydrodynamic model MIKE 21 HD, Flexible Mesh is used for simulating the flow field in the model domain and MIKE 21 MT for the sediment transport studies in the existing and the proposed scenario under prevailing tidal and wave conditions. The brief description of scientific background of MIKE 21 HD and MIKE 21 MT is given below.

5.1 MIKE-21 HD MODULE:

For any major developments in coastal areas, it is necessary to know dynamics of the water body in terms of velocity and water level fluctuations beforehand. The appropriate governing equations for studying water movement in coastal areas are the two-dimensional shallow water equations. These shallow water equations are obtained by vertically integrating the 3-Dimensional incompressible Reynold's averaged Navier- Stokes equations of motion over depth $h = \eta + d$ with the following simplified assumptions.

- The flow is incompressible,
- The flow is well mixed (no variation in density)
- Vertical accelerations are negligible,
- Bed stress can be modeled.

$$\frac{\partial h}{\partial t} + \frac{\partial h\bar{u}}{\partial x} + \frac{\partial h\bar{v}}{\partial y} = hS \qquad (1)$$

$$\frac{\partial h\bar{u}}{\partial t} + \frac{\partial h\bar{u}^2}{\partial x} + \frac{\partial h\overline{vu}}{\partial y} = f\bar{v}h - gh\frac{\partial \eta}{\partial x} - \frac{h}{\rho_0}\frac{\partial p_a}{\partial x} - \frac{gh^2}{2\rho_0}\frac{\partial \rho}{\partial x} + \frac{\tau_{sx}}{\rho_0} - \frac{\tau_{bx}}{\rho_0} -$$

$$\frac{1}{\rho_0}\left(\frac{\partial s_{xx}}{\partial x} + \frac{\partial s_{xy}}{\partial y}\right) + \frac{\partial}{\partial x}(hT_{xx}) + \frac{\partial}{\partial y}(hT_{xy}) + hu_sS \qquad (2)$$

$$\frac{\partial h\bar{v}}{\partial t} + \frac{\partial h\bar{v}^2}{\partial x} + \frac{\partial h\overline{uv}}{\partial y} = f\bar{u}h - gh\frac{\partial \eta}{\partial y} - \frac{h}{\rho_0}\frac{\partial p_a}{\partial y} - \frac{gh^2}{2\rho_0}\frac{\partial \rho}{\partial y} + \frac{\tau_{xy}}{\rho_0} - \frac{\tau_{by}}{\rho_0} -$$
$$\frac{1}{\rho_0}\left(\frac{\partial s_{yx}}{\partial x} + \frac{\partial s_{yy}}{\partial y}\right) + \frac{\partial}{\partial x}(hT_{xy}) + \frac{\partial}{\partial y}(hT_{yy}) + hv_sS \qquad (3)$$

The over bar indicates a depth average value for example, $\bar{u}$ and $\bar{v}$ are the depth-averaged velocities defined by

$$h\bar{u} = \int_{-d}^{n} u dz\,, \qquad h\bar{v} = \int_{-d}^{n} v dz$$

The lateral stresses T_{ij} include viscous friction, turbulent friction and differential advection. They are estimated using an eddy viscosity formulation based on the depth average velocity gradients.

$$T_{xx} = 2A\frac{\partial \bar{u}}{\partial x} \qquad T_{xy} = A\left(\frac{\partial \bar{u}}{\partial y} + \frac{\partial \bar{v}}{\partial x}\right) \qquad T_{yy} = 2A\frac{\partial \bar{v}}{\partial y}$$

The following symbols are used in the equations:

t	:	Time
x and y	:	Cartesian co-ordinates
$h = \eta + d$	:	Total water depth
d	:	Still water depth
S_{xx}, S_{xy}, S_{yy}	:	Components of radiation stresses
$\tau_{xx}, \tau_{xy}, \tau_{yy}$	:	Shear stress components
ρ	:	Density of water
$\bar{u}\bar{v}$	:	Depth averaged velocities
η	:	Surface Elevation
g	:	acceleration due to gravity (m/s^2)
f	:	wind friction factor related to Coriolis parameter
p_a	:	Atmospheric pressure
ρ_0	:	Density of water
S	:	Magnitude of discharge due to point sources
u_s, v_s	:	velocities at point sources
$f = 2\Omega sin\Phi$	:	Coriolis parameter (Ω is the angular rate of revolution and φ the geographic Latitude)
A	:	Horizontal eddy viscosity

The governing equations are solved by using an element-centered finite volume method. The spatial domain is discretised into non-overlapping elements, which can be either triangular or quadrilateral. The time integration can be done by using first order explicit Euler method (referred to as the lower temporal order scheme) or by using second order Runge Kutta method (referred to as the higher temporal order scheme).

5.2 MIKE-21 MT MODULE

The sediment transport studies were carried out using MIKE 21 MT model. This model simultaneously solves hydrodynamic and sediment transport equations. The calibration of sediment transport model is difficult because morphological changes are too slow and temporal bed changes are too variable to measure anything significant for comparison. The sediment fluxes at various locations may differ and the following factors contribute for these variations:

- Unsteadiness of flow,
- Mixtures of sediment in suspension,
- Variability of supply of mobile sediment on the bed,
- Presence of sandy (non-cohesive) sediment,
- Omission of depth variation,
- Effect of wave stirring.

The erosion, transport and deposition of silt, mud and clay particles under action of currents and waves can be best described by the multi-layers mode of the mud transport module of MIKE 21. The sediment transport module is dynamically coupled with the 2-dimensional hydrodynamic module, MIKE 21 HD. The module solves the primitive equations in two dimensions using finite difference methods by Alternating Direction Implicit technique and the Double Sweep algorithm. Following are the relationships used in the module.

The sediment transport formulations are built into the advection-dispersion module, MIKE 21 AD, which solves advection-dispersion equation:

$$\frac{\partial c}{\partial t}+u\frac{\partial c}{\partial x}+v\frac{\partial c}{\partial y}=\frac{1}{h}\frac{\partial}{\partial x}\left(hD_x\frac{\partial c}{\partial x}\right)+\frac{1}{h}\frac{\partial}{\partial y}\left(hD_y\frac{\partial c}{\partial y}\right)+Q_L C_L\frac{1}{h}-S \qquad (4)$$

The following symbols are used in the equation:

c	:	compound concentration (arbitrary units)
u,v	:	horizontal velocity components in x, y directions (m/s)
h	:	water depth (m)
Dx,Dy	:	dispersion coefficients in the x,y directions (m2/s)
S	:	accretion/erosion term (kg/m3/s)
QL	:	source discharge per unit horizontal area (m2/s/m2)
CL	:	concentration of source discharge (kg/m3)

The advection-dispersion equation is solved using an explicit, third-order finite difference scheme, and known as the ULTIMATE scheme.

6.0 MODEL STUDIES

The MIKE 21 HD module is used to study the hydrodynamics. For studying the sedimentation, MIKE 21 MT module is used. These modules are used for the existing and proposed layouts. The details of MIKE 21 HD and MIKE 21 MT modules used in this study are discussed below.

6.1 Computational Model

The spatial extent of computational model considered for model simulations is 16km (cross-shore) X 22km (along the shore). The computation model with its offshore and onshore boundaries is shown in Fig. 8. The Chittari river discharging into the ocean is considered to a certain extent in the computation model as shown in Fig. 8.

All oceanographic features of the study region in existing condition are incorporated in the computational model. The complete study area was discretised into computational unstructured mesh. The spatial resolution of the mesh is finer along the area of development (harbour area). Finer mesh resolution is adopted near harbour area in order to capture the variation in near shore tide and currents more accurately. The mesh resolution is coarser along the offshore boundary. The developed mesh showing the fine and coarser resolution in the computational model is shown in Fig. 9.

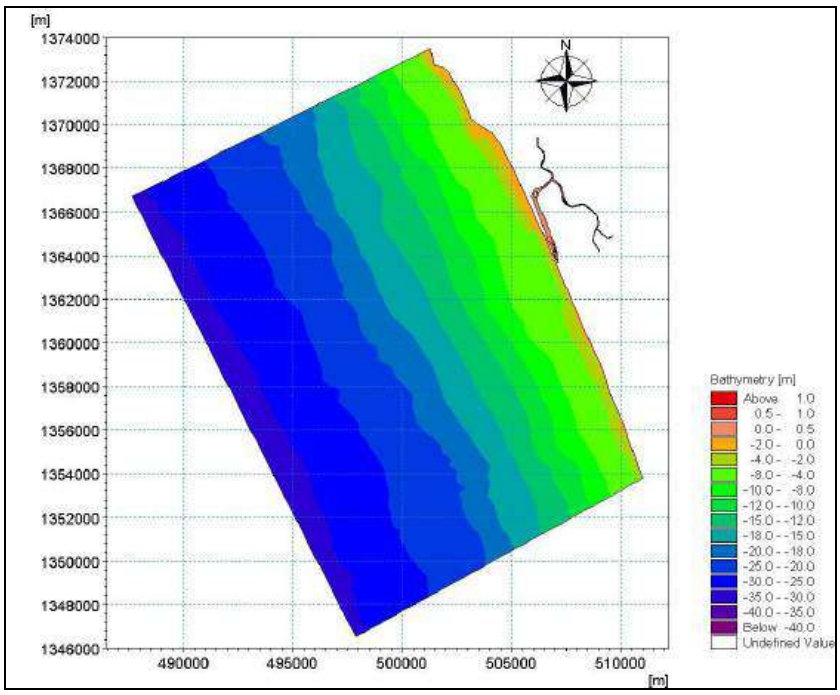


Figure 8: Computational model

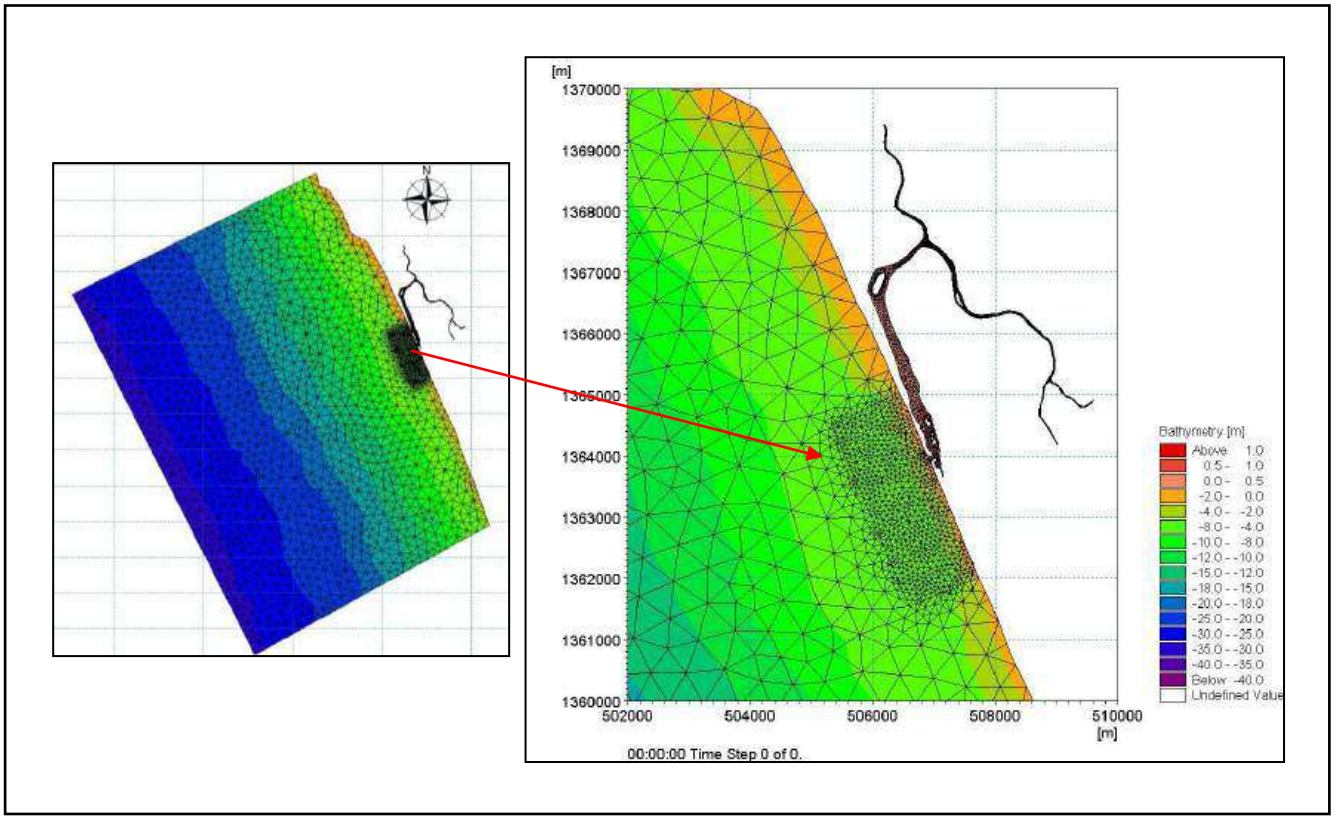


Figure 9: Computational mesh showing variable mesh resolution

6.2 Simulation of Flow Field – Existing condition- non-monsoon and monsoon seasons

Initially, flow field are modelled for the existing conditions for both non-monsoon and monsoon seasons. Defining boundary condition is essential for modelling the flow field. There are three offshore boundaries and one land boundary. The boundary tides are defined along these three offshore boundaries. The boundary tides obtained from MIKE 21 Global tidal model is used to define the boundary condition with phase lag. Further, discharge along the Chittari river is also given as another boundary condition. As the flow is assumed to be parallel to the contours along the western boundary, no-cross flux was considered in the west boundary in the open sea. Radiation stresses are also considered in the simulation to take into account the effect of wave induced currents. With these given forcings, MIKE 21 HD module is used to model the variation in tides and currents for a period of 15 days in non-monsoon (March 2023) and monsoon (July 2023) separately. The changes in flow fields are estimated every 30 minutes. Typical velocity vector plots during different phase of tides obtained during non-monsoon and monsoon seasons are shown from Fig. 10 to Fig. 13.

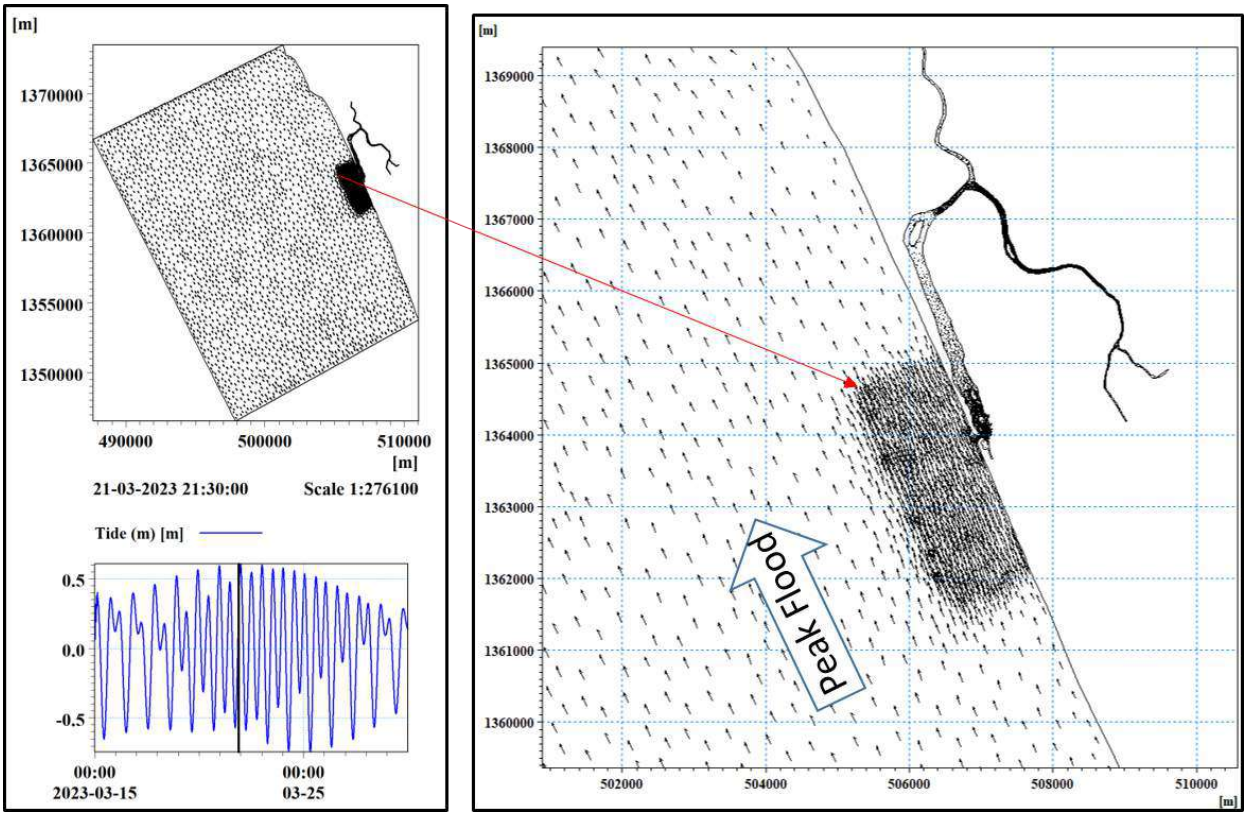


Figure 10: Flow field during peak flood-Non-monsoon season (Existing)

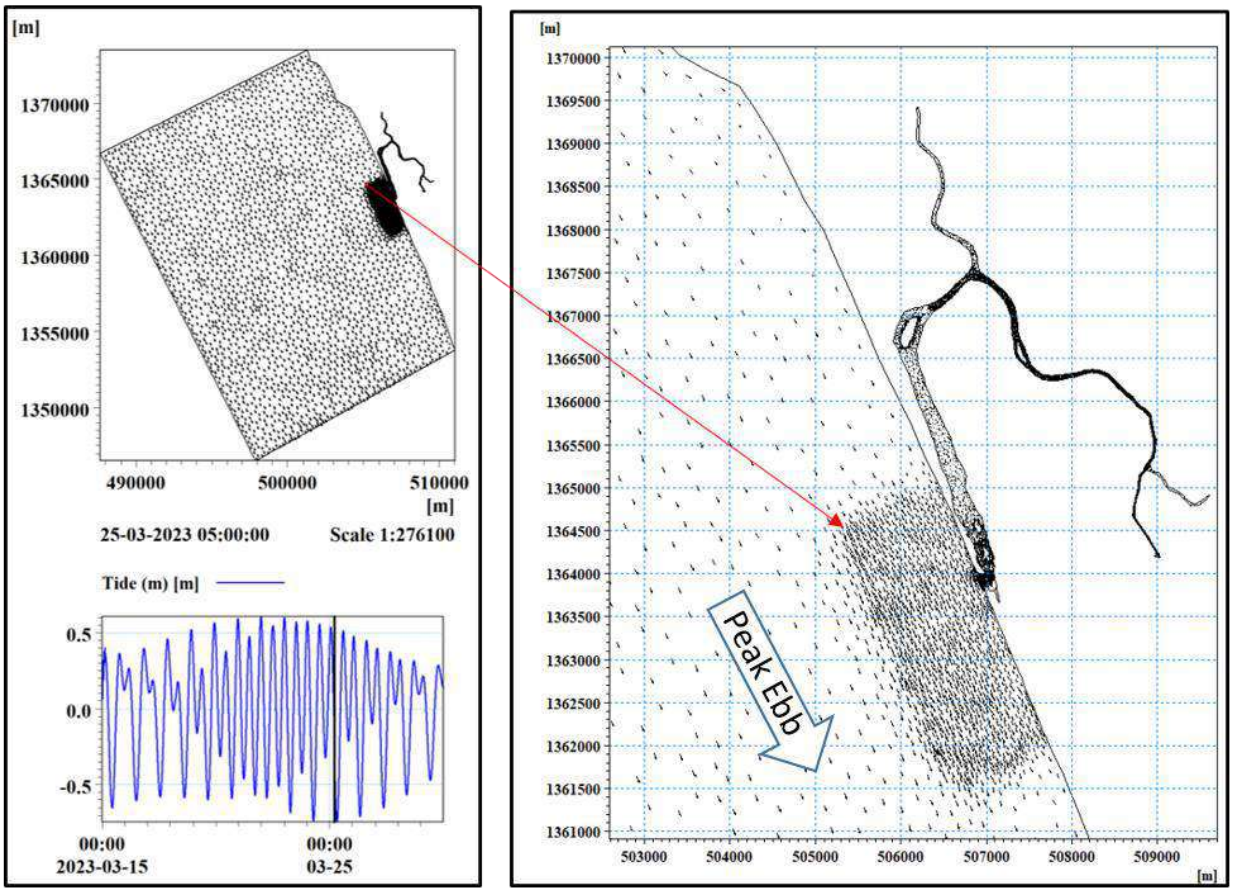


Figure 11: Flow field during peak ebb -Non-monsoon season (Existing)

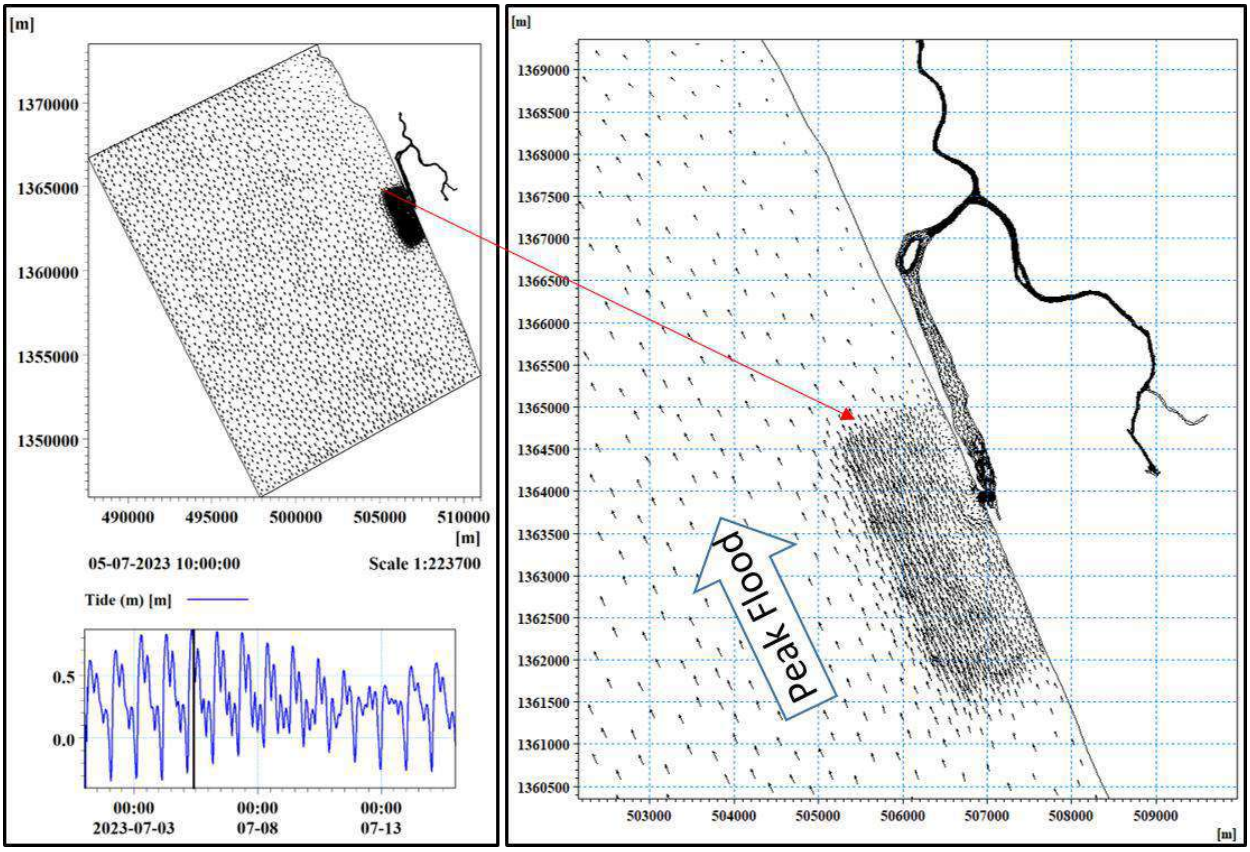


Figure 12: Flow field during peak flood- Monsoon season (Existing)

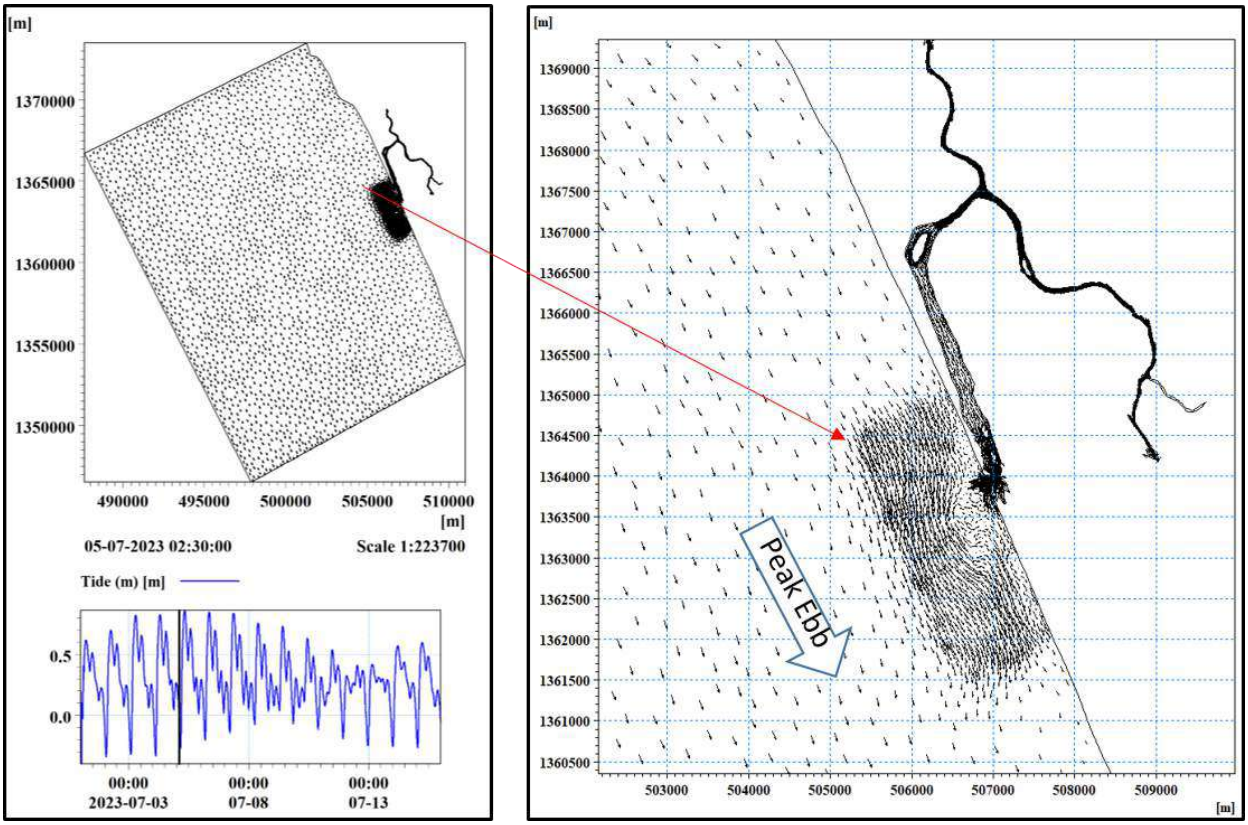


Figure 13: Flow field during peak ebb- Monsoon season (Existing)

The length of the vector gives magnitude of the current while the arrowhead shows the direction of flow. During peak flood, flow follows natural contour parallel to the coastal. The observed data of tides and current are provided at two points (P1 and P2) in the study area by the HED. Point P1 and Point P2 is located along the river and sea side of the computational domain respectively. The details of geographical location of P1 and P2 is discussed above in section 3. These two points are used for the purpose of comparison of modelled tides and currents against the observed values. The observed data of tides and currents at P1 and P2 are obtained during non-monsoon season only. The comparison of computed tides against the field values during non-monsoon season is shown in Fig. 14.

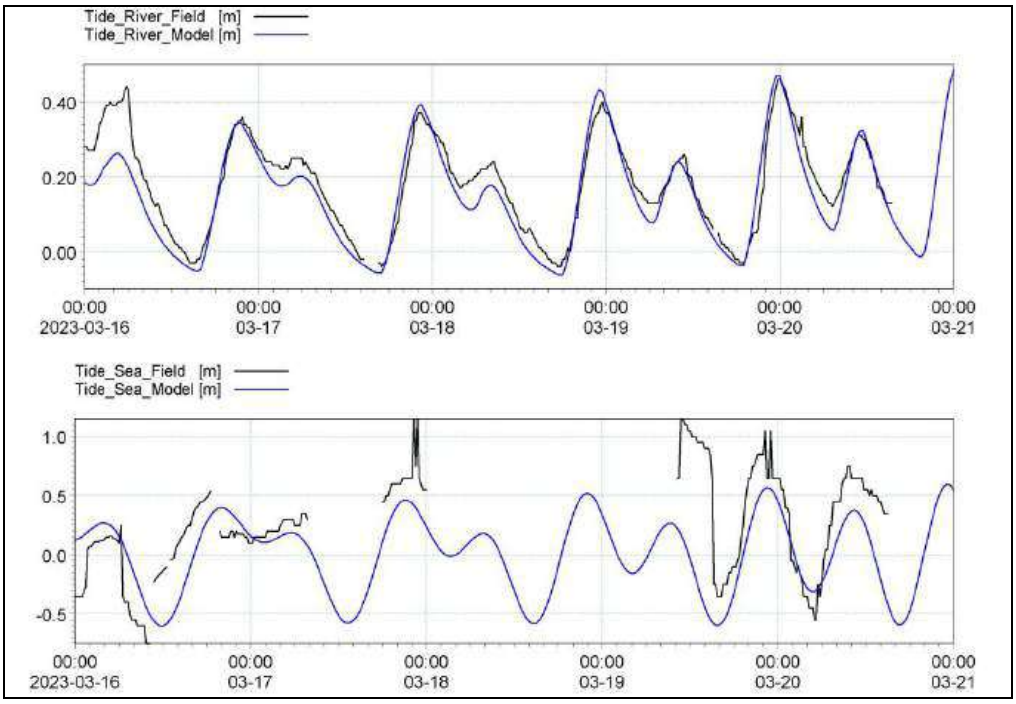


Figure 14: Comparison of tides (Field Vs Computed)

From the Fig.14, it is observed that there is good correspondence between the computed and field values of tides at the point P1. The good correspondence at P1 signifies the efficacy of model calibration. Due to the inherent ambiguity of the field current data at P1 and P2 provided by the PA, it is not possible to compare the computed values of currents at P1 and P2 against the field data. However, modelling results of currents shows that peak values of currents are captured more accurately by the model. Hence, there is good correspondence of computed peak current with the field peak currents. The peak of field current is 0.14m/s and peak of computed current obtained is 0.17m/s at P1. Similarly, at P2 peak of field current is 0.40m/s whereas peak of obtained computed current is 0.39m/s. The littoral drift and sediment pattern studies for the existing condition is discussed below

6.3 Littoral Drift Studies

Littoral drift studies are necessary for mapping the littoral distribution and changes in shoreline at the proposed location of fishing harbour. The littoral drift at this study area was carried out by CWPRS in the year 2016. The simulation results of the littoral studies were already reported vide Technical Report: - T.R. No. 5357 of 2016. The study reveal that annual southward and northward transports are 0.531Mm^3 and 0.118Mm^3 respectively with the net and gross transports being 0.413Mm^3 and 0.649Mm^3 respectively. Other findings of the study reveal that shoreline evolution in 10 years period will result in accretion on the northern side (68m in cross shore direction) and southern side (40m in cross-shore direction) of the proposed northern and southern breakwater respectively. This accretion and erosion is expected to extend further upto 2500m and 1500m towards along the shore towards north and south direction respectively. The shoreline evolution over the years for accretion and erosion is shown in Fig.15. Taking into consideration the influential role of silt and clay (mud) on sedimentation, in the present study, Mud Transport (MT) is modelled using MIKE 21 MT for identifying the spatially varying zones of sedimentation.

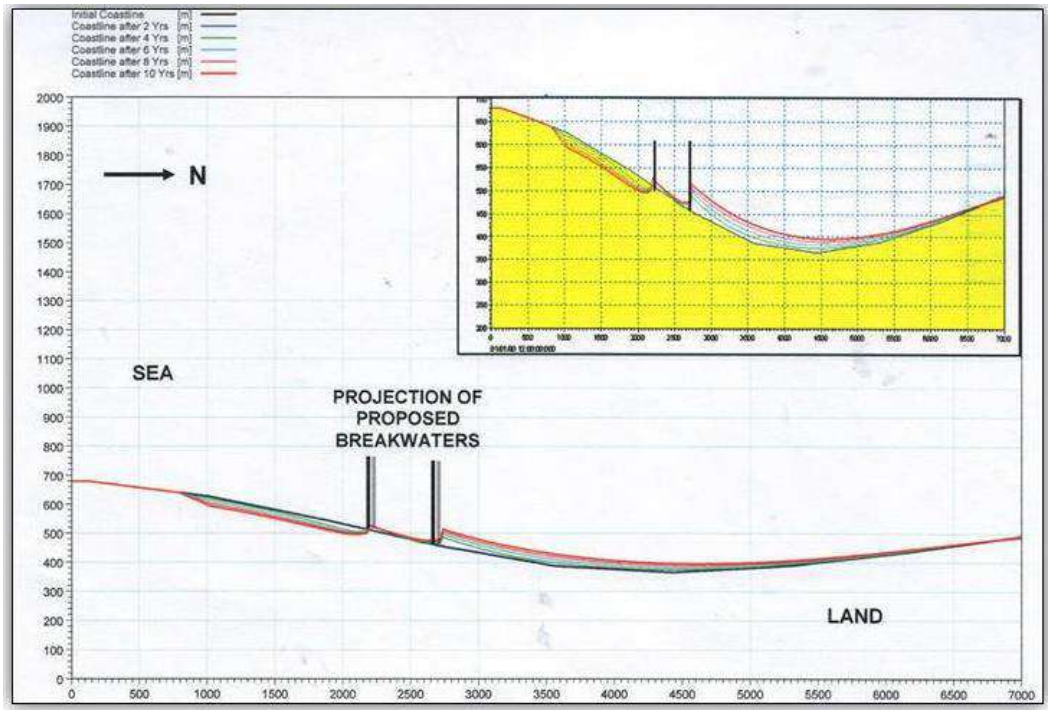


Figure 15: Shoreline evolution after 2nd,4th ,6th,8th and 10th year

6.4 Sedimentation Pattern - Existing Condition-non-monsoon and monsoon seasons

The sedimentation studies were carried out for the existing conditions for both non-monsoon and monsoon seasons using MIKE21 MT module. The results of hydrodynamic studies is one of the important inputs for sedimentation modelling using MIKE21 MT . Other inputs required are SSC and bed sample data in the study area. The data of SSC and bed sample are given by

HED for non-monsoon season. For monsoon season 50% increased SSC fraction of non-monsoon season is assumed to be adopted as input for sedimentation modelling. Using these inputs in the MIKE 21 MT model, sedimentation studies were carried out for the existing condition for a period of one month. The sedimentation patterns during non-monsoon and monsoon seasons are shown in Fig. 16 and Fig. 17 respectively. During monsoon period with the elevated discharge of Chittari River, flushing out of sediments deposited during non-monsoon period is observed. The estimated deposition (maximum) of about 0.1m in a year over the computational domain is obtained. The annual sedimentation estimated at the river mouth is about 0.021m for the existing condition.

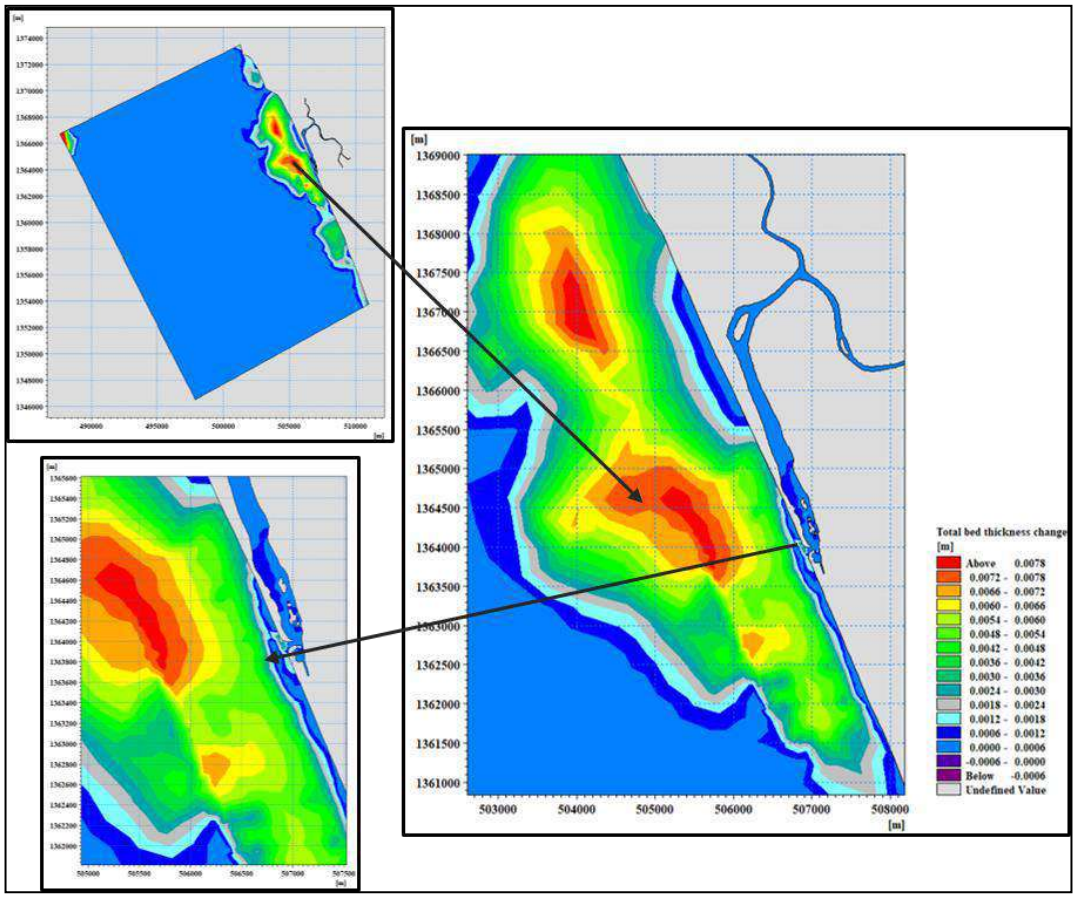


Figure 16: Sedimentation pattern during Non-monsoon season (Existing)

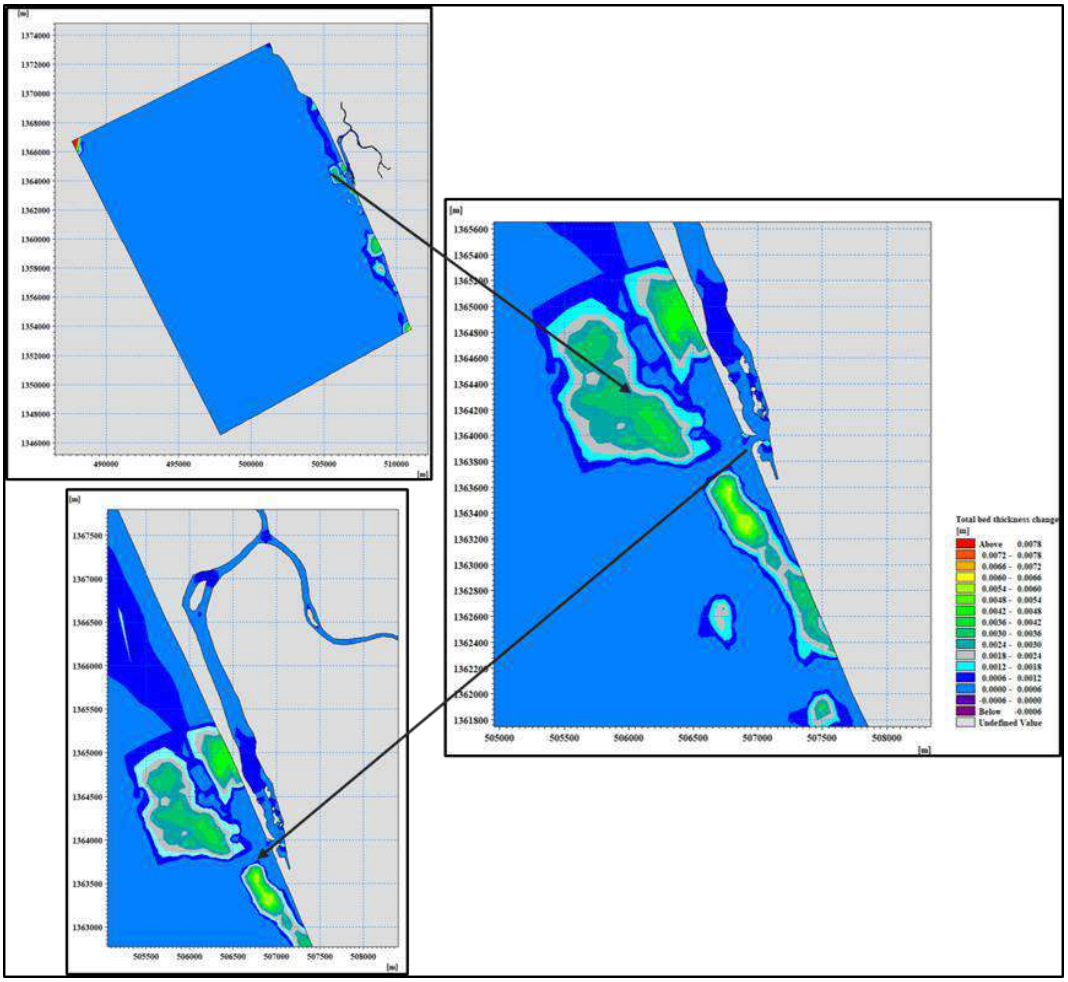


Figure 17: Sedimentation pattern during Monsoon season (Existing)

6.5 Simulation of Flow Field - Proposed Condition-non-monsoon and monsoon seasons

The calibrated model setup of existing condition was re-established by incorporating the features of the proposed layout. The layout consists of 1150m long north breakwater, 425m long south breakwater, 435m breakwater as a river training work & dredging (-2m) inside the approach channel nearer to the Chittari river mouth and suitable dredging along the river. The layout also consists of dredging of -4m inside the proposed fishing harbour. The bathymetry after re-establishing the proposed layout is shown in Fig. 18.

The computation domain with the unstructured mesh developed for the proposed layout is shown in Fig. 18. The mesh resolution considerations are the same as discussed in the section 6.1.

The flow is modelled during non-monsoon and monsoon seasons following the similar procedure and boundary condition constraints as adopted for simulating the flow conditions for the existing conditions. MIKE 21 HD module is again simulated to get the outputs of tides and currents for the proposed layout.

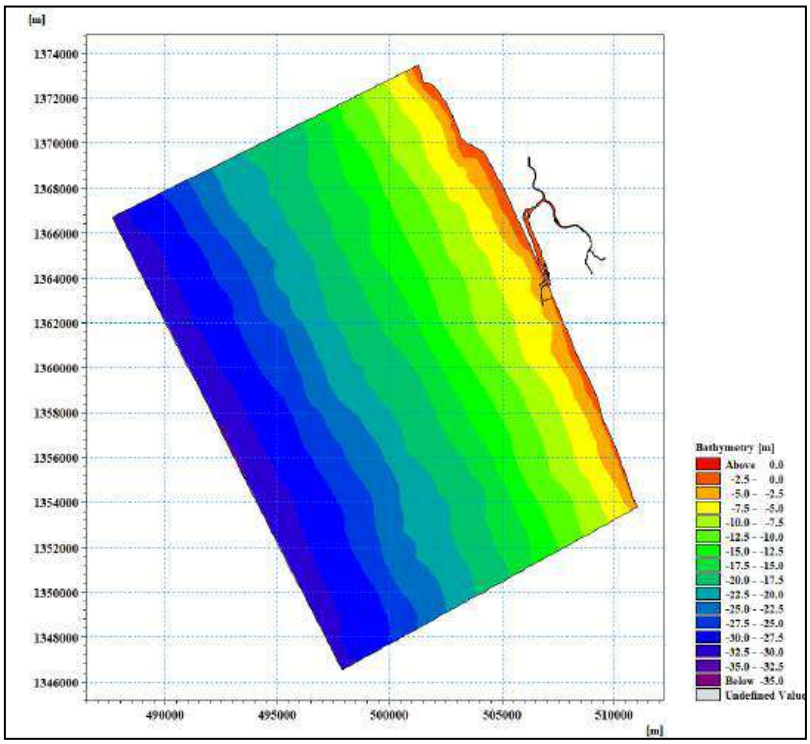


Figure 18: Bathymetry with proposed layout

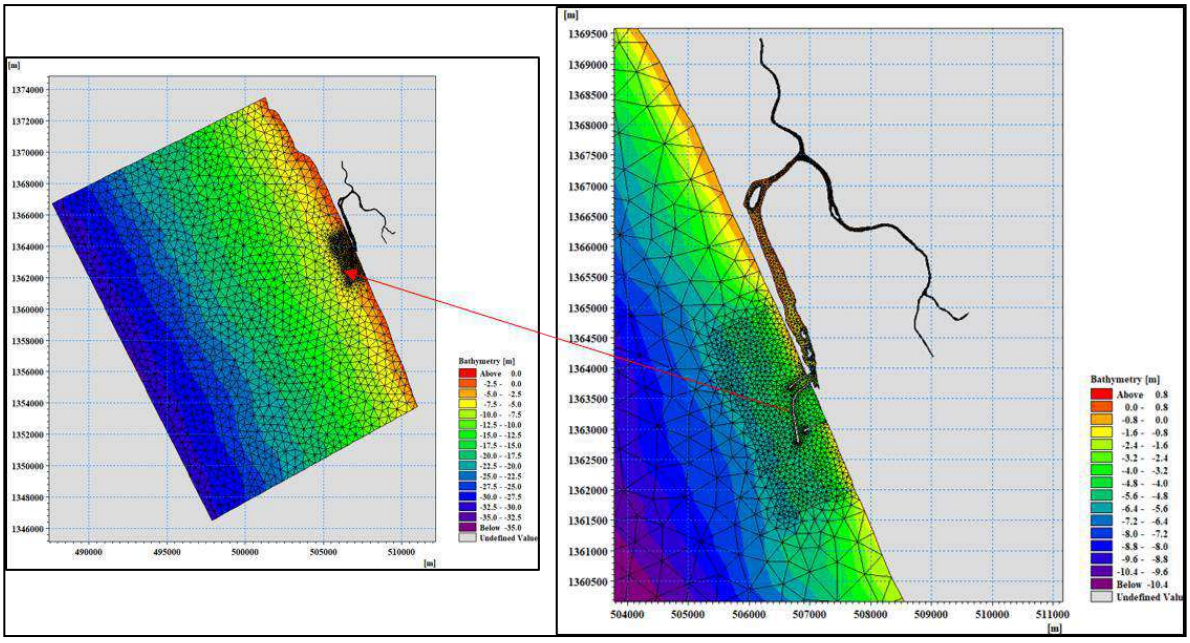


Figure 19: Computational domain for proposed layout

The flow fields along the model domain obtained for non-monsoon and monsoon seasons during peak flooding and ebbing tidal phases are shown from Fig. 20 to Fig. 23. During non-monsoon season, it is observed from the flow fields that circulation is formed near south breakwater during ebbing phase of tide. However, during monsoon season, circulation is formed near south breakwater (during flooding and ebbing phase of tide). In addition, during flooding phase, circulation is formed at 2 other locations (near north breakwater and entrance of river mouth) also. Though eddies formed around the circulation are weak, its intensity may

change according to changes in local climate. Furthermore, four points t1, t2, t3 and t4 called as monitoring stations are considered for assessment of changes in currents after construction of proposed layout. The locations of these four monitoring stations are shown in Fig. 24.

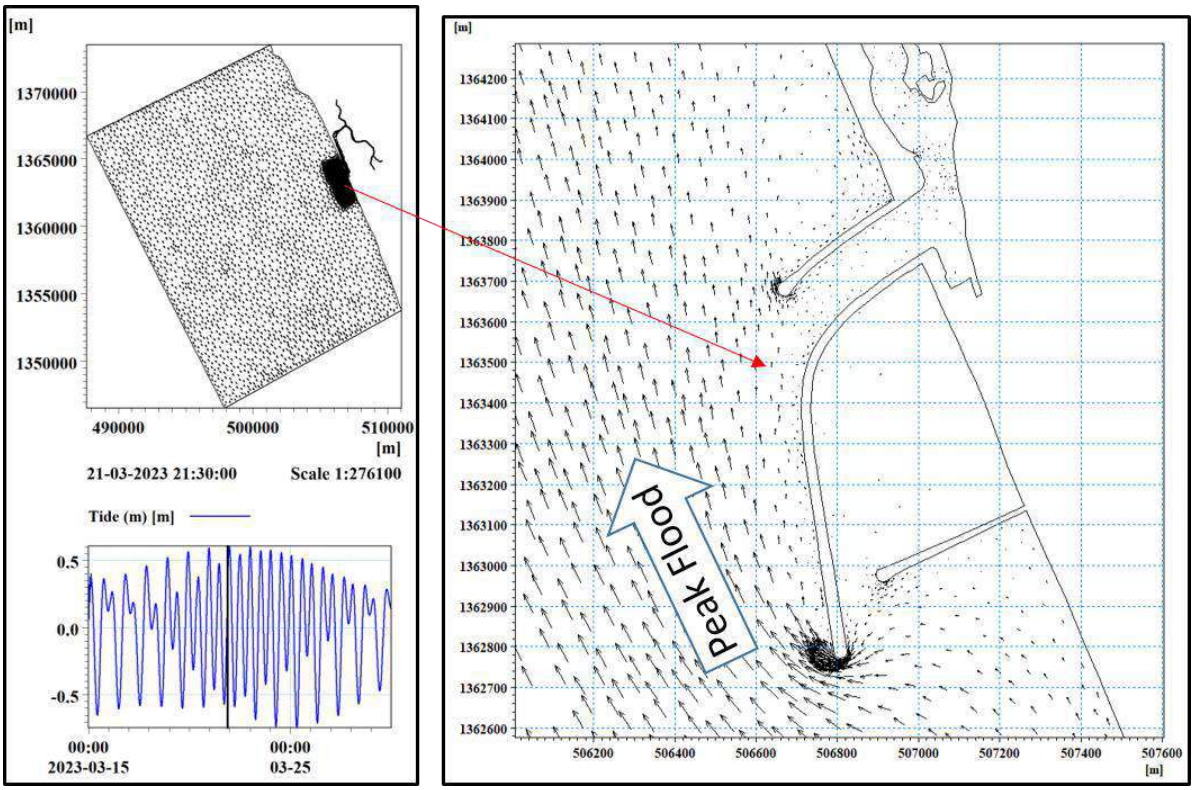


Figure 20: Flow field during peak flood-Non-monsoon season (Proposed condition)

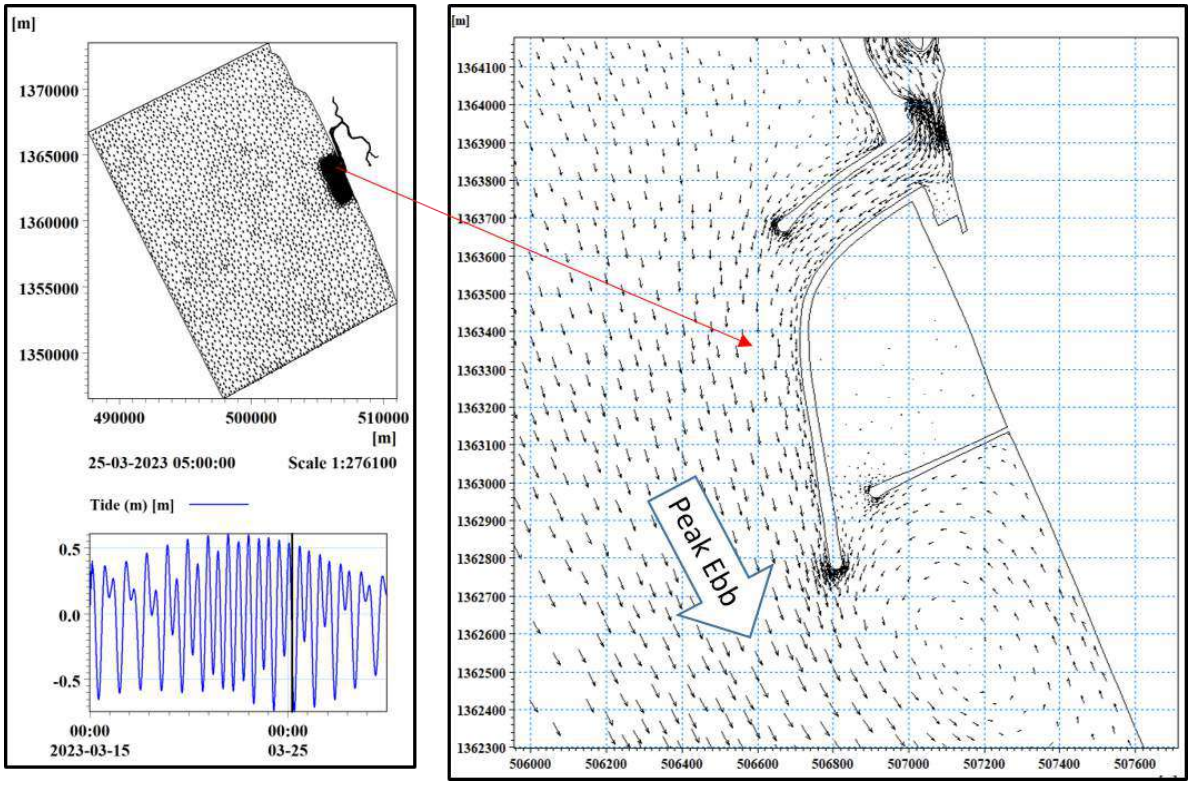


Figure 21: Flow field during peak ebb -Non-monsoon season (Proposed condition)

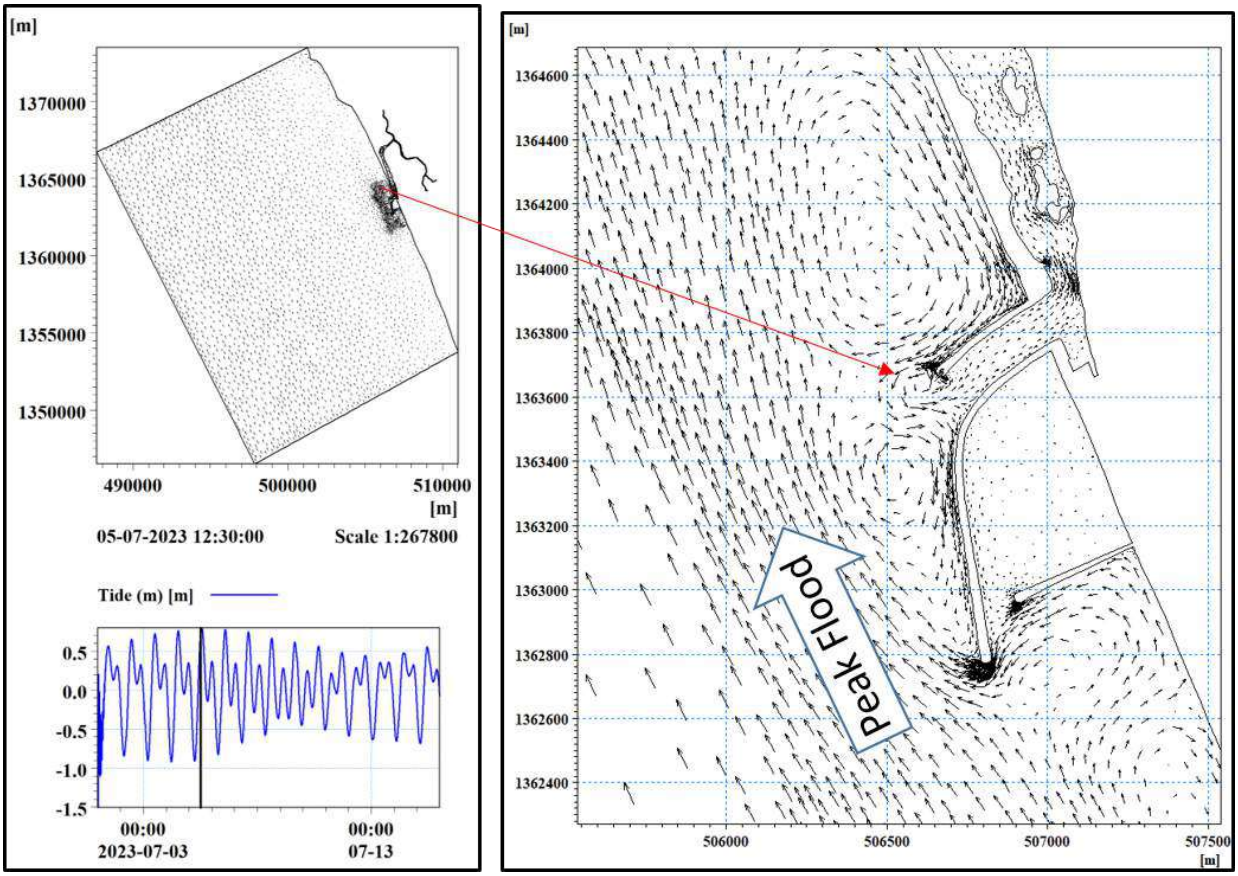


Figure 22: Flow field during peak flood- Monsoon season (Proposed condition)

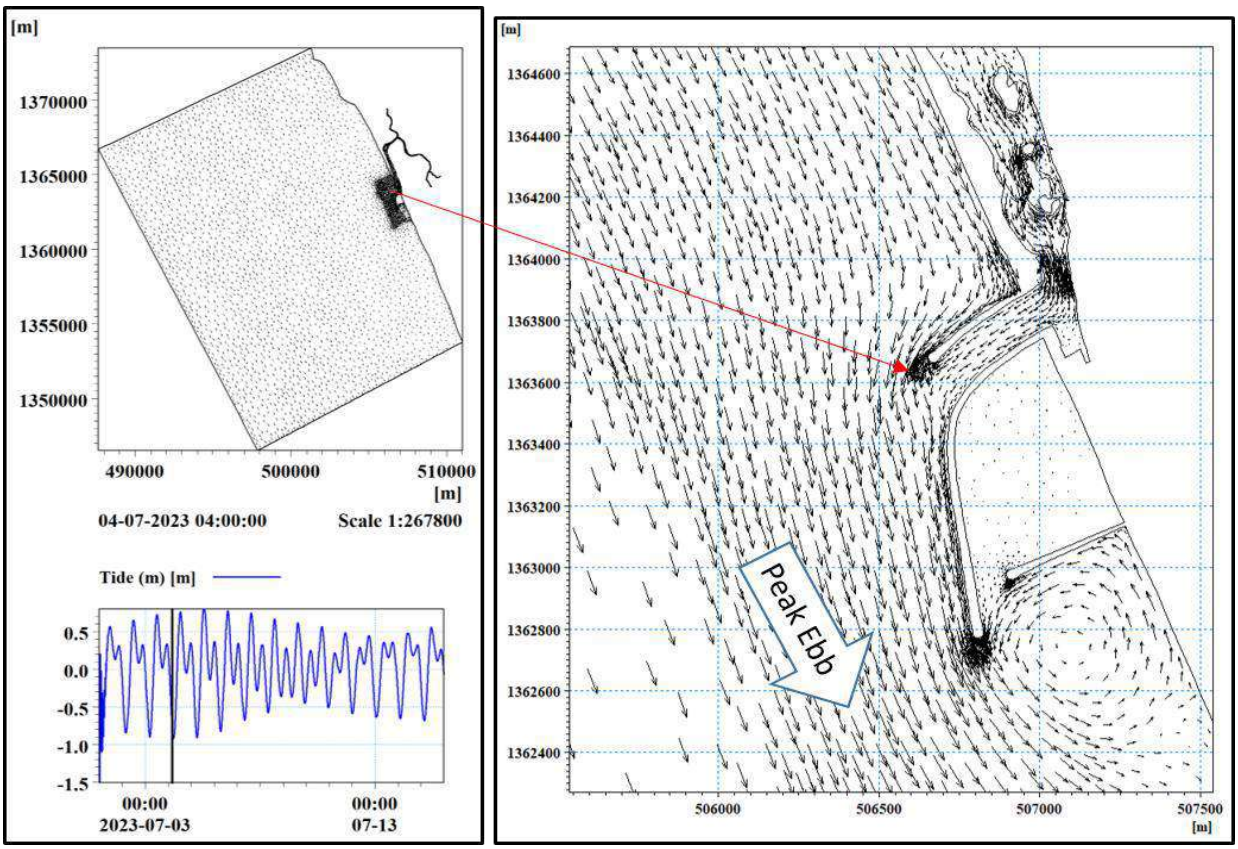


Figure 23: Flow field during peak ebb- Monsoon season (Proposed condition)

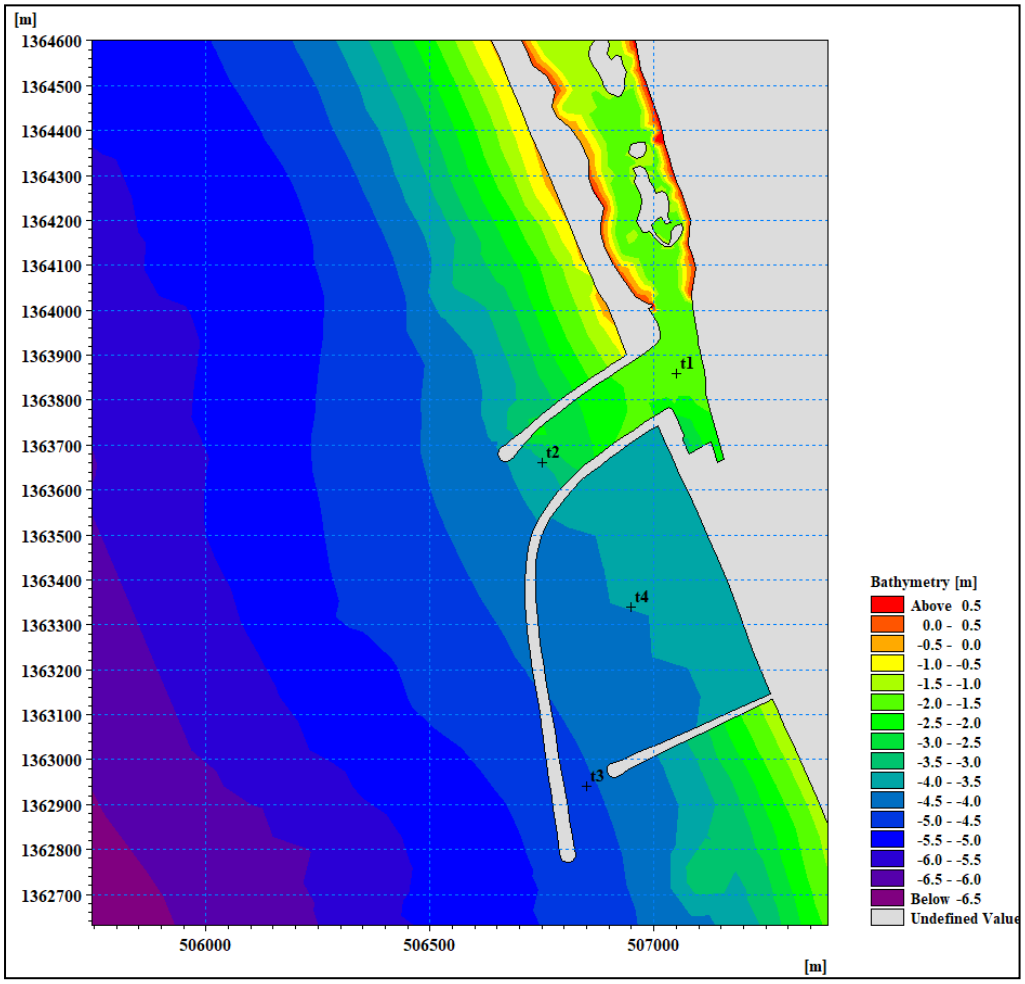


Figure 24: Details of proposed layout with monitoring stations

The computed currents during non-monsoon and monsoon period at all monitoring stations obtained for the proposed layout is compared against the computed currents at corresponding points for the existing condition. The comparison is shown in Fig. 25 and Fig. 26. It is observed from Fig. 25 and Fig. 26 that both during non-monsoon and monsoon season only at the monitoring station t1, there is increase in magnitude (from 0.007 m/s to 0.1m/s during non-monsoon and from 0.015m/s to 0.3m/s during monsoon season) of currents after the proposed construction work. At t2, t3 and t4, the magnitude of currents is significantly reduced after the proposed development. During non-monsoon season, the peak modelled currents at t2, t3 and t4 for existing condition are 0.43m/s, 0.38 m/s and 0.39 m/s respectively. After the proposed development the currents at these three monitoring stations are reduced to 0.11m/s, 0.06m/s and 0.008m/s. However, during monsoon season, at t2, t3 and t4 for existing conditions, the peak modelled currents are 0.55m/s, 0.46m/s and 0.49m/s respectively. The currents at t2, t3 and t4 are reduced to 0.21m/s, 0.11m/s and 0.003m/s after proposed development during monsoon season.

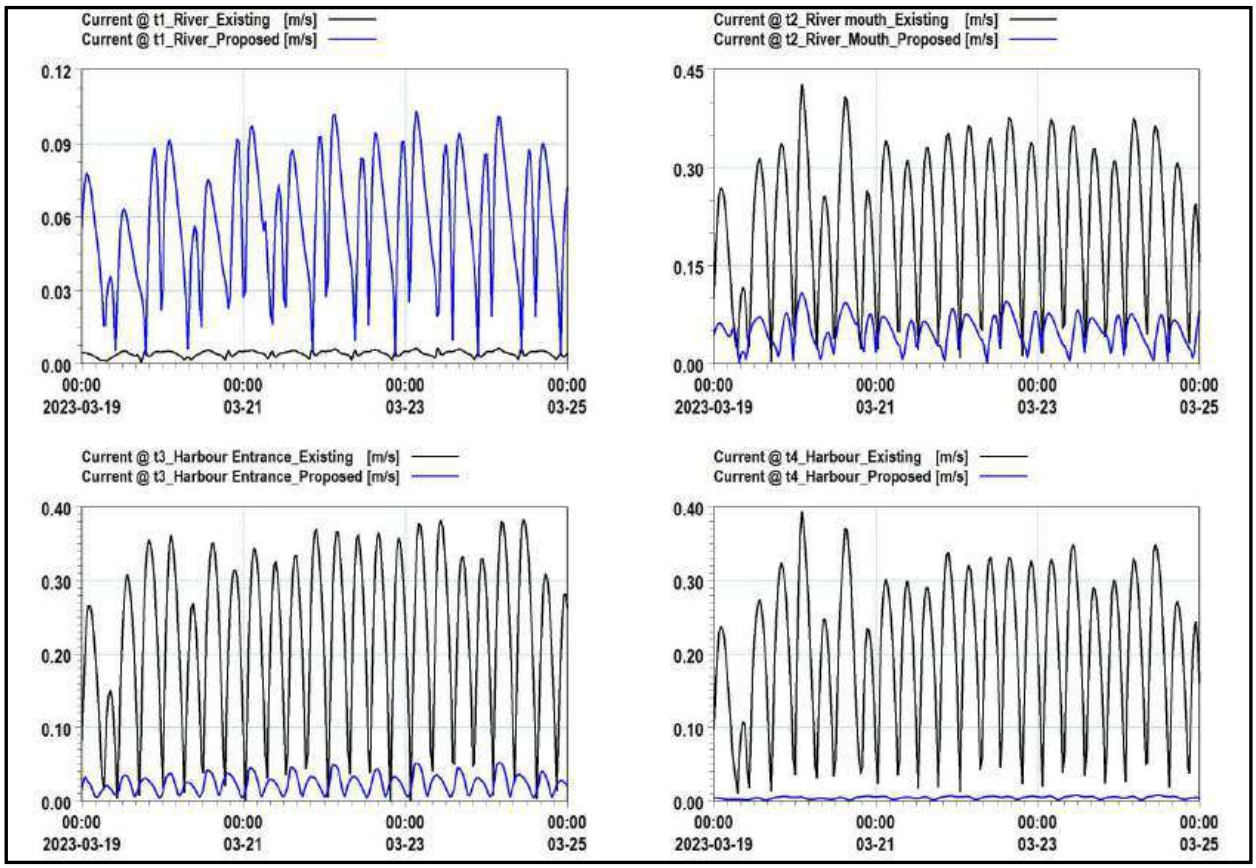


Figure 25: Currents at monitoring stations during Non-monsoon season
(Existing Vs Proposed condition)

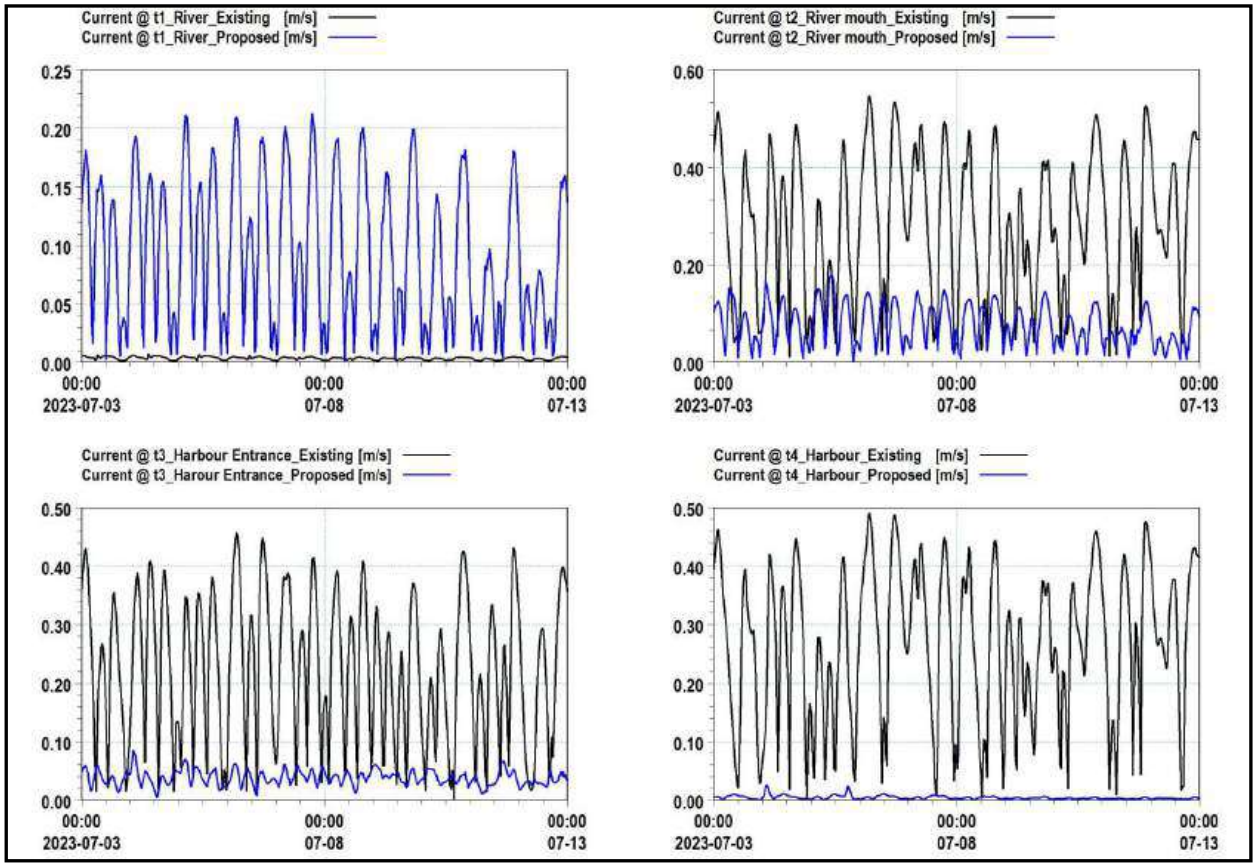


Figure 26: Currents at monitoring stations during Monsoon season
(Existing Vs Proposed condition)

6.6 Sedimentation Studies – Proposed condition- non-monsoon & monsoon seasons

The sedimentation studies were carried out for the proposed conditions for both non-monsoon and monsoon seasons by using MIKE 21 MT module over a period of one month. The sedimentation pattern during non-monsoon and monsoon seasons are shown in Fig. 27 and Fig. 28 respectively. During the monsoon season, there is slight increase in deposition (Fig. 28) at the river mouth and below the southern breakwater as compared to non-monsoon season. The annual sedimentation estimated in the Fishing Harbour is about 0.03m and at the North and South side of the proposed development annual sedimentation is estimated to be about 0.05m. The annual sedimentation estimated at the river mouth is about 0.045m for the proposed condition. The deposition of sediments near the north and south breakwater is majorly due to formation of circulation at these locations.

The sedimentation estimated is slightly higher in the river mouth region for the proposed condition as compared to the existing condition. The minor increase in sedimentation for the river mouth of proposed condition can be attributed to decrease in currents after establishing the proposed layout.

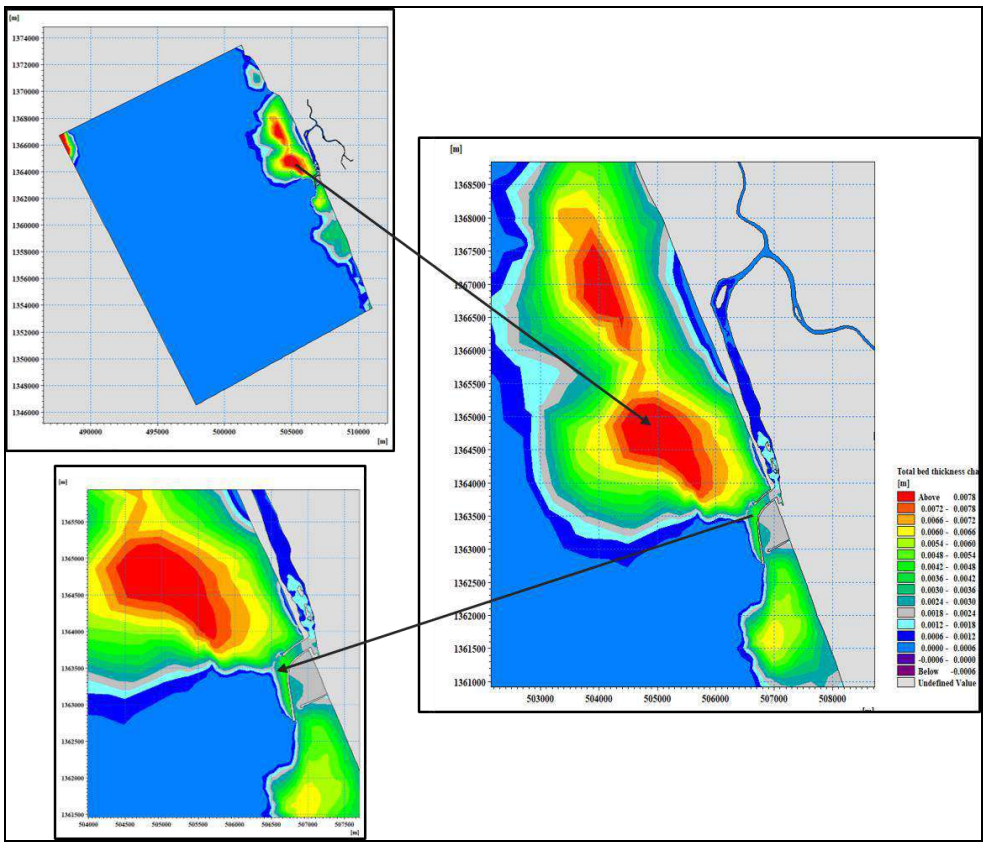


Figure 27: Sedimentation pattern during Non-monsoon season (Proposed)

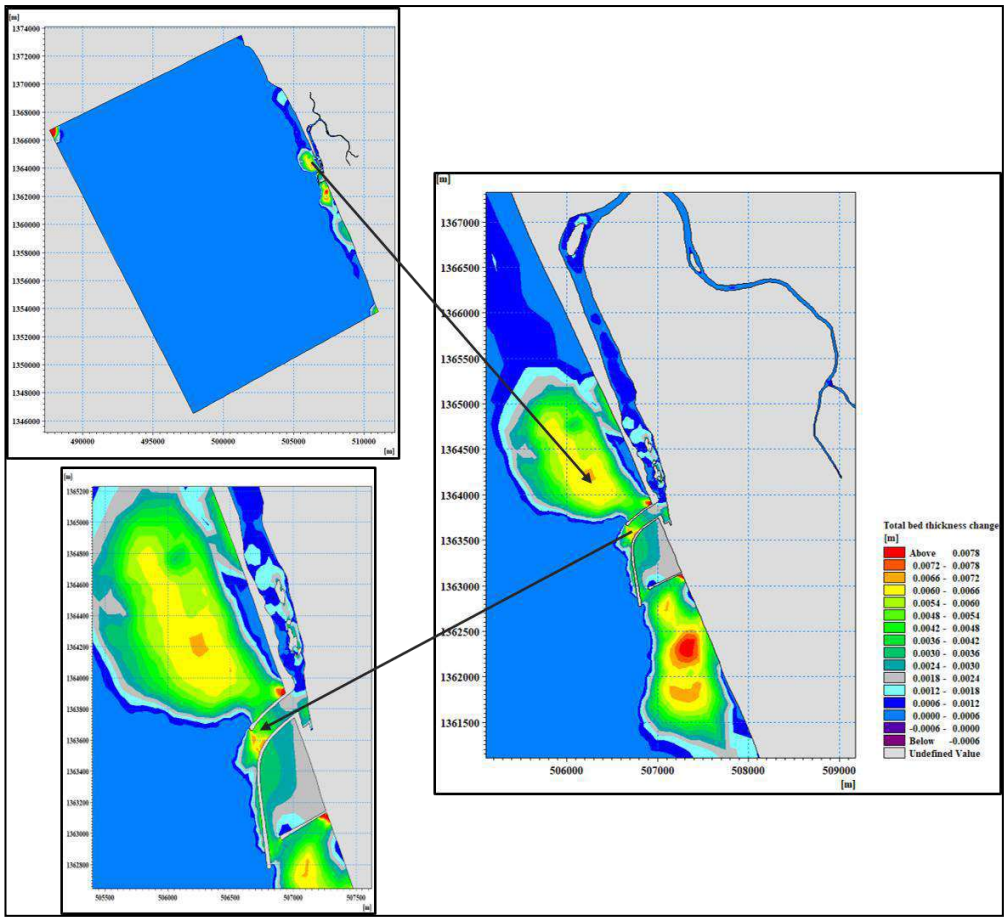


Figure 28: Sedimentation pattern during Monsoon season (Proposed)

6.7 Effect of Littoral Drift

Due to littoral drift, accretion and erosion are taking place on the north and south sides of the proposed development, respectively. The shoreline evolution after 10 years is predicted as accretion on the northern side extending up to 2500m along the shore and about 68m in cross-shore direction, and as erosion on the southern side extending up to 1500m along the shore and about 40m in cross-shore direction. It is observed that the shifting of the river mouth is about 200m towards the north over a year. If the shifting of the river mouth is pronounced after the proposed development of the river training works then a seawall of appropriate length may be provided to arrest the shifting of the river mouth. Similarly, if the erosion on the south side of the proposed fishing harbour is progressive after the development then a suitable shore protection measure in the form of a seawall or series of groynes may be provided.

7.0 CONCLUSIONS

The mathematical modelling studies for the proposed fishing harbour at Ajanur are undertaken. The simulations of hydrodynamics and sedimentation are performed for the existing conditions and for the proposed layout. Both non-monsoon and monsoon seasons are considered. The major conclusions of the study are given below:-

(i) In the existing condition, the hydrodynamic model results during non-monsoon season shows good calibration of the model with the field observed data.

(ii) The sedimentation studies for the existing condition shows some promising results of sedimentation pattern. Under the existing conditions, the estimated annual sedimentation i.e., depth of deposition is about 0.021m at the river mouth.

(iii) For the proposed development, due to dredging in the proposed area, modelling studies shows decrease in the currents in most of the area of study region (monitoring stations t2, t3 and t4) as compared to the existing condition.

(iv) The sedimentation pattern for the proposed condition shows sedimentation of the order of 0.045m per annum near the river mouth. Sedimentation is also noticed near the north and the south breakwaters (0.05 m in a year). In the fishing harbour area sedimentation of about 0.03 m in a year is estimated.

(v) If the erosion on the south side of the proposed fishing harbour is progressive after the development then a suitable shore protection measure in the form of a seawall or series of groynes may be provided.

(vi) If the shifting of the river mouth is pronounced after the proposed development of the river training works then a seawall of appropriate length may be provided to arrest the shifting of the river mouth.

(vii) The capital dredging in the fishing harbour area, in the river mouth and along the river is calculated to be about 1.1Mm^3. During the construction phase there are debris getting deposited in the dredged area. Therefore, this factor should also be considered for effective planning of construction. Also, maintenance dredging should be carried out near the river mouth and at the harbour entrance to maintain the desired depth for smooth movement of marine vessels.

(viii) The study suggest a proposed layout consisting of 1150m long north breakwater, 425m long south breakwater and 435m breakwater as a river training work near the mouth of Chittari river.

8.0 REFERENCES

1. CWPRS Technical Report No.5357, “Mathematical Model studies for littoral drift and shoreline evolution due to the proposed fishery harbour at Ajanur Dist. Kasargod, Kerala” (February 2016).
2. CWPRS Technical Report No.5436, “Wave propagation studies to determine wave climate for the development of fish landing facilities at Ajanur Dist. Kasargod, Kerala” (November 2016).
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Annexure-I








Photographs at Ajanur Fishing Harbour

WAVE FLUME STUDY REPORT

भारत सरकार / GOVERNMENT OF INDIA
जल शक्ति मंत्रालय / MINISTRY OF JAL SHAKTI
जल संसाधन, नदी विकास और गंगा संरक्षण विभाग
DEPARTMENT OF WATER RESOURCES, RIVER DEVELOPMENT AND GANGA REJUVENATION
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तटीय अभियांत्रिकी संरचनाएं प्रभाग
COASTAL HYDRAULIC STRUCTURES DIVISION

तकनीकी रिपोर्ट संख्या :6177
नवम्बर, 2023

TECHNICAL REPORT NO :6177
NOVEMBER, 2023

केरल के कासारगोड जिले में स्थित अजानूर में मत्स्यन बंदरगाह के लिए तरंगरोधक के डिजाइन के लिए डेस्क और तरंग फ्लूमिका अध्ययन

DESK AND WAVE FLUME STUDIES FOR THE DESIGN OF BREAKWATER FOR FISHERY HARBOUR AT AJANUR IN KASARGOD DISTRICT, KERALA

Dr. R.S. Kankara
Director

REPORT DOCUMENTATION SHEET	
Technical Report No. 6177	**Date: NOVEMBER, 2023**
Title: DESK AND WAVE FLUME STUDIES FOR THE DESIGN OF BREAKWATER FOR FISHERY HARBOUR AT AJANUR IN KASARGOD DISTRICT, KERALA	
Officers Responsible for Conducting the Studies: These studies were conducted by Shri S. R. Tayade, Scientist 'D' with the assistance of Dr. Praveen K. M., Scientist 'B', Shri S. P. Jagtap, Assistant Research Officer, Shri G. R. Pardeshi, Shri Deepak Sharma, Research Assistants, Shri Sushant Gupta, LA-II under the supervision of Dr. J. Sinha, Scientist 'E' & Shri A. V. Mahalingaiah, Scientist 'E' and Dr. Prabhat Chandra, Additional Director and overall guidance of Dr. R. S. Kankara, Director, CWPRS, Pune. Shri Prabhakar Chary, Scientist 'C', Mrs. R.B. Ananda, Scientist 'B', Mrs. M. C. Pawar, Assistant Engineer, Shri Yognath, J.E. of RSWG group were associated, while conducting the wave flume studies at CWPRS.	
Name and Address of Organization Conducting the Studies **Coastal Hydraulic Structures Division** **Central Water and Power Research Station, Pune, India**	
Name and Address of Authority Sponsoring the Studies: **Chief Engineer,** **Harbour Engineering Department,** **Kamaleswaram, Manacaud,** **Thiruvananthapuram** **Kerala – 695009**	
Synopsis Harbour Engineering Department, Government of Kerala has a proposal to develop a fishing harbour at Ajanur. In view of this, Chief Engineer, Harbour Engineering Department, Govt of Kerala referred hydraulic model studies to CWPRS for the proposed fishing harbour at Ajanur. The studies were undertaken and the Mathematical Model Studies for wave tranquility at the proposed fishing harbour at Ajanur was carried out at CWPRS, Pune. Based on the Mathematical Model Studies, it was suggested to construct 1150 m long north breakwater and 625 m long south breakwater. Accordingly, desk & wave flume studies were conducted to evolve the cross-section of breakwater based on the actual site survey data and other hydraulic parameters. Design of breakwater with tetrapods in the armour was evolved based on the desk and wave flume studies. The design of breakwater at -4.50 m bed level consists of 6.0 t tetrapod in the seaside armour placed on 1:2 slope in double layer from el. +0.0 m to el. +7.0 m. A 7.0 m wide and 0.5 m thick crest slab with 0.5 m thick parapet wall is proposed at el. +6.5 m. The top of crest slab and parapet wall is kept at el. +7.0 m and +8.0 m respectively. A 6.0 m wide toe-berm is provided at el. +0.0 m consists of 2.0 t to 3.0 t stones with a sea side slope of 1:2. The hydraulic stability tests were conducted in the wave flume by reproducing the section to a Geometrically Similar (GS) model scale of 1:29. For the design of breakwater, water level of 2.60 m was considered as the Design Water Level (DWL), 1.40 m above the HWL (Storm Surge + Sea level rise). The significant wave height of 4.0 m was considered for the design of breakwater.	
Keywords Breakwater, Storm Surge, Armour, Tetrapod's, Toe-Berm etc.	

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1.0 INTRODUCTION

Ajanur village (Latitude 12.33° N and Longitude 75.18° E) in Kasargod District of Kerala is situated on the west coast of India, 15 km south of the district headquarter (Fig. 1). Harbour Engineering Department, Government of Kerala has a proposal to develop a fishing harbour at Ajanur. In view of this, Chief Engineer, Harbour Engineering Department, Govt of Kerala has referred hydraulic model studies to CWPRS for the proposed fishing harbour at Ajanur.

Based on these requirements, Mathematical Model Studies for wave tranquility for the proposed fishing harbour at Ajanur was carried out at CWPRS, Pune (Technical Report No. 5436 of Nov 2016). As per the layout no. 4 suggested in CWPRS Technical Report the harbour basin area comes out to be about 19 ha. Considering the suggestions given by the Technical Sanction committee of PMMSY schemes, Harbour Engineering Department proposed to increase the basin area upto 26 ha. Accordingly, Additional Mathematical Model Studies for wave tranquility (CWPRS Technical Note, July 2022) has been carried out for the proposed increased area. Based on the Mathematical Model Studies, it was suggested to construct 1150 m long north breakwater and 425 m long south breakwater.

Accordingly, desk studies were conducted for evolving the conceptual cross-section of the breakwater using empirical methods and past experience of CWPRS and considering the hydraulic/site conditions such as bathymetry, tides and waves prevailing at site. Thereafter, the wave flume studies were conducted for assessing the hydraulic stability of the proposed breakwater cross-section at Ajanur, Dist. Kasargod, Kerala.

This report describes in detail the desk & the wave flume studies carried out to evolve design of the breakwater for achieving tranquil condition in the proposed fishing harbour at Ajanur, Kerala.

2.0 SCOPE OF STUDIES

For the proposed development of fishery harbour at Ajanur in Kasargod district of Kerala, the following hydraulic model studies entrusted to CWPRS by Chief Engineer, Harbour Engineering Department, Thiruvananthapuram:

1. Additional Mathematical Model Studies for wave tranquility for the revised layout of fishery harbour at Ajanur, Kerala.
2. Desk and wave flume studies for the design of breakwater for fishery harbour at Ajanur in Kasargod district, Kerala.

On the basis of Mathematical Model Studies for wave tranquility for the proposed fishery harbour at Ajanur, 1150 m long north breakwater and 425 m long south breakwater are suggested as shown in Fig. 2.

The scope of the present studies includes evolving the conceptual design for the suggested breakwater based on empirical methods and the conditions prevailing at the site. Further, the conceptual design of the breakwater was assessed for its hydraulic stability by conducting wave flume tests for various design wave conditions.

3.0 SITE CONDITIONS

Ajanur village in Kasargod District is situated about 15km south of district headquarter at Latitude 12.33° N and Longitude 75.18° E in Kerala state. Majority of village population belongs to fishermen community. At present, the fisherman are operating their boats in open sea & they are facing difficulties in navigating the vessels due to shallow depth & direct wave action.

In view of this, Harbour Engineering Department, Govt of Kerala has a proposal to construct a fishery harbour south of the Chittari River mouth at Ajanur in Kasargod district, Kerala.

4.0 DESIGN CONDITIONS

4.1 Tidal Levels

The tides in the region are semidiurnal in nature. The maximum tidal range at Kasargod is about 1.0 m. The tidal currents are generally parallel to the coastline. The following tidal levels at Kasargod have been considered for the wave flume studies (Reference: Admiralty Chart No. 217 of 2019):

Table 1: Normal Tidal Levels at Kasargod, Kerala

Tides	Level w.r.t Chart Datum
Mean Higher High Water (MHHW/HWL)	+1.40 m
Mean Lower High Water (MLHW)	+1.30 m
Mean Sea Level (MSL)	+1.00 m
Mean Higher Low Water (MHLW)	+0.90 m
Mean Lower Low Water (MLLW/LLWL)	+0.40 m

A Design Water Level (DWL) of 2.60 m was considered including MHHW and 1.20 m above the MHHW i.e Storm Surge (0.80 m) + Sea level rise (0.40 m). These water levels are with respect to Chart Datum (CD). The design of breakwater cross-sections was also tested at HWL, MSL and LLWL water levels.

4.2 Design Wave Conditions

The predominant wave direction at proposed site in Kasargod district is SSW. Following design conditions were considered for the stability of the breakwater against wave attack and to provide tranquil condition in the harbour area:

1. Zero-order (0 to 1 %) damage for the significant wave height of 4.0 m at +2.60 m (DWL) and +1.40 m (HWL).
2. Overtopping is not permitted.
3. The wave periods considered for the tests are 8, 10 and 12 seconds.
4. The stability of the section is also to be assessed at an intermediate water level and low water level.

5.0 DESIGN OF BREAKWATER

The desk and wave flume studies have been conducted for evolving cross-section of the breakwater with tetrapods in the armour layer based on empirical formulae, existing conditions at the site and previous in-house extensive wave flume studies conducted at CWPRS for hydraulic stability of breakwater. The weight of armour units are basically evaluated based on Hudson's formula (as given below):

$$W = \frac{w_r H_s^3}{K_D \times (Sr-1)^3 \cdot \cot\theta}$$

Where,

H_s = Breaking wave height (m)
W = Weight of Armour (t)
w_r = Unit Weight of Armour (t/m^3)
K_D = Stability Coefficient for Breaking Wave Height
S$_r$ = Specific Gravity of Armour relative to Water at the structure (w_r / W_w)
W_w = Unit wt. of sea water (t/m^3)
Cot θ = Slope of armour

The conceptual design cross-section of the breakwater with tetrapods in the armour were evolved based on the desk studies as shown in Fig. 4. The design of breakwater at -4.50 m bed level consists of 6.0 t tetrapod in the seaside armour placed on 1:2 slope in double layer from el. +0.0 m to el. +7.0 m. A 7.0 m wide crest slab with 0.5 m thick parapet wall is proposed with top el. +7.0 m. The top of parapet wall is kept at el. +8.0 m. A 6.0 m wide toe-berm is provided at el. +0.0 m consists of 2.0 t to 3.0 t stones with a sea side slope of 1:2. Secondary layer consists of 0.5 – 1.0 t stones below the armour layer and 200 – 300 kg stones below the toe-berm armour. A 0.30 m thick bedding layer consisting of stones up to 20 kg is provided at -4.50 m bed level.

6.0 HYDRAULIC MODEL STUDIES

6.1 Random Sea Wave Flume

The random sea wave flume having dimensions 90 m (length) x 2 m (width) x 1.50 m (height) was utilised for the wave flume tests as shown in Annexure-I / Photo 1. The system is capable of generating maximum wave height

of 0.4 m at a water depth of 0.6 m for wave periods ranging between 0.3 and 3 sec. The flume facility is equipped with a fully automated computerised random wave generating system comprising of computer, hydro-servo system and wave board assembly. The command signals are sent by computer to the servo-valve through which pressurised oil supplied by hydraulic power pack flows into the actuator. A *To* and *Fro* motion of the piston drives the wave board, which in turn generates waves in the flume.

6.2 Wave Measurement and Calibration

The wave heights were measured by capacitance type wave probes. A gauge was fixed in front of the model and was analysed by computer. The desired wave conditions in front of the model were obtained by matching of desired spectrum and achieved spectrum by iterative procedure.

6.3 Wave Flume Test Procedure

The cross-section of the breakwater was tested under a normal attack of waves in a 2-D wave flume for its hydraulic stability (Photo 1). The model of breakwater cross-section was constructed to a Geometrically Similar (GS) scale in the wave flume. The dimensions of the random wave flume are 90 m length, 2 m width and 1.5 m depth wherein both regular as well as random waves of desired wave height/wave period and desired standard wave spectrum respectively can be generated. Before starting the test, the number of tetrapods provided in the armour and stones in the toe-berm were counted. After conducting the tests for one-hour duration, the number of tetrapods/stones, if any, displaced from its original position were recorded and percentage of damage to the armour/toe-berm of breakwater was determined. During the test, the extent of splashing/overtopping over the crest was also recorded. The damage is expressed as percentage of number of tetrapods/stones displaced from their position. The percentage of damage is equal to "Number of units displaced/total no. of units used in the respective layer".

6.4 Model Scale

The model tests for design of cross-section of the breakwater were conducted in 2-D wave flume by reproducing the section to a Geometrically Similar scale of 1:29. The model was based on Froude's criterion of similitude. Various scales obtained are as follows:

Table 2: Scale Ratio for Model Studies of the Breakwater

Model scale 1:29		
Length	$-L$	= 1:29
Area	$-L^2$	= 1:841
Volume	$-L^3$	= 1:24389
Time	$-L^{1/2}$	= 1:5.385
Velocity	$-L^{1/2}$	= 1:5.385

6.5 Gradation of Stones

Details of various gradations of stones in prototype of the trunk of the breakwater and those used in the model having scale 1:29 are given table 3:

Table 3: Gradation of Stones for Trunk of Breakwater

Prototype		Model (Scale 1:29)	
Average	**Gradation**	**Average**	**Gradation**
2.5 t	2 – 3 t	100 gm	80 to 120 gm
1.5 t	1 – 2 t	60 gm	40 to 80 gm
0.75 t	0.5 – 1 t	30 gm	20 to 40 gm
250 kg	200 – 300 kg	10 gm	8 to 12 gm

6.6 2-D Wave Flume Tests

The cross section of the breakwater, as shown in Fig. 4, was constructed with a Geometrically Similar model scale of 1:29 in the wave flume. Tests were conducted considering both random and regular wave conditions to assess the stability of the breakwater. For random waves, 4.0 m significant wave height (H_s) was considered. To achieve this H_s, Pierson-Moskowitz (PM) spectrum was used for acquiring desired wave height in the 90 m wave flume. For acquiring desired

regular wave height i.e. non breaking wave height in front of the breakwater, series of wave height analysis was carried out with the help of in-house computer program.

The tests were carried out at CWL, MHHW, MSL & MLWL with various wave conditions. The tests were conducted for one-hour duration each in the model corresponding to about 5.39 hours (approx.) in the prototype. The objectives of the tests were to check hydraulic stability of the breakwater against various wave conditions likely to occur in the vicinity of proposed fishery harbour area at Ajanur, Kasargod district.

The details of the wave flume tests were conducted for breakwater cross-section at -4.50 m bed level with random waves are described as follows:

1) Initially, a test was conducted with random waves at a significant wave height (H_s) of 4.05 m at Design Water Level (+2.60 m) for one hour duration (corresponding to 5.39 hours in prototype) using PM (Pierson-Moskowitz) spectrum. There was no overtopping and moderate splashing observed during the test. The test showed that there was no damage occurred to both armour layer and toe-berm (Photograph No. 2).

2) An endurance test was conducted at Design Water Level (+2.60 m) with random waves using PM (Pierson-Moskowitz) spectrum for the significant wave height of 4.85 m (120% of H_s i.e. 4.80 m) for one hour duration. During the test, it was observed that there was moderate splashing but no overtopping. After conducting the test for one hour duration, no damage was observed in the armour and the toe-berm (Photograph No. 3).

3) Further, a test was conducted with random waves at a significant wave height (H_s) of 4.0 m at the Mean Higher High Water (MHHW) (+1.40 m) for one hour duration using PM (Pierson-Moskowitz) spectrum. There was no splashing and no overtopping observed during the test. After the test, it was observed that there was no damage occurred in the armour as well as in the toe-berm (Photograph No. 4).

4) Another test was conducted with random waves at a significant wave height (H_s) of 3.97 m at Mean Sea Level (+1.00 m) for one hour duration (corresponding to 5.39 hours in prototype) using PM (Pierson-Moskowitz) spectrum. During the test, no splashing and no overtopping was observed. There was no damage to the toe-berm as well as to the armour observed after the test (Photograph No. 5).

5) A test was conducted with random waves at a significant wave height (H_s) of 3.76 m at Mean Lower Low Water Level (+0.40 m) for one hour duration (corresponding to 5.39 hours in prototype) using PM (Pierson-Moskowitz) spectrum. No splashing and no overtopping were observed during the test. After the test, it was observed that there was no damage to the toe- berm as well as to the armour (Photograph No. 6).

From the past experiences during the model testing, it has been revealed that many-times the structures were also susceptible to undergone damages during the regular wave conditions, therefore the cross-section of breakwater was also tested in the regular wave conditions.

The details of **regular wave testing** on the breakwater cross-section are as follows:

6) A test was conducted, at the Design Water Level of +2.60 m under the attack of regular waves of 10 sec period with wave height (H_{10}) of 5.0 m. There was minor overtopping and moderate splashing of waves observed during the test. The maximum wave run-up was upto +5.85 m and run-down was up to +0.72 m were observed. After conducting the test under the condition for one hour in the wave flume, no damage was observed in the armour layer and in the toe-berm (Photograph No. 7).

7) A test was also carried out under the attack of regular (monochromatic) waves at Mean Higher High Water (+1.40 m). The duration of test was one hour in the model corresponding to about 5.39 hours in the prototype. The test was conducted for wave height of (H_{10}) of 5.12 m with 12 second period. During the test, it was noticed that the maximum wave run-up was upto +5.0 m and run-down was up to +0.15 m. There

was no damage observed to the toe-berm stones and to the armour layer after the test. There was no splashing and no overtopping of waves observed (Photograph No. 8).

8) Further, a test was conducted for one hour duration at Mean Higher High Water (MHHW) of +1.40 m under the attack of regular waves of 10 sec period with wave height (H_{10}) of 5.0 m. During the test, no overtopping and no splashing was observed. The maximum wave run-up was upto +5.10 m and run-down was up to [-] 0.20 m. No damage was observed in the armour layer and in the toe-berm (Photograph No. 9).

9) Another test was conducted for one hour duration at Mean Higher High Water (MHHW) of +1.40 m under the attack of regular waves of 8 sec period with wave height (H_{10}) of 5.0 m. During the test, no splashing and no overtopping was observed. The max wave run-up was up to +4.25 m and run-down up to +0.00 m were observed. After conducting the test, there was no damage observed in the armour layer and toe-berm (Photograph No. 10).

10) A test was also carried out under the attack of regular (monochromatic) waves at Mean Sea Level (+1.00 m). The duration of test was one hour in the model corresponding to about 5.39 hours in the prototype. The test was conducted for wave height of 5.07 m (H_{10}) with 10 second period. During the test, it was observed that the maximum wave run-up and run-down was up to +3.50 m and up to (-) 0.50 m respectively. There was no damage observed in the toe-berm as well in the armour. No splashing and no overtopping of waves were observed (Photograph No. 11).

11) Another test was conducted for one hour duration at Mean Lower Low Water Level (MLLW) of +0.40 m under the attack of regular waves of 10 sec period with wave height (H_s) of 4.80 m. During the test, no splashing and no overtopping was observed. The max wave run-up was up to +3.50 m and run-down up to (-) 1.10 m were observed. After conducting

the test, there was no damage observed in the armour layer and toe-berm (Photograph No. 12).

All results of tests conducted for the cross-section of the breakwater (trunk portion) are summarized in the Table 4, and photographs of all the tests are enclosed as Annexure-V.

Overall, the cross-section of the breakwater was found stable against the higher wave action at high water level. No damage to the toe-berm and to the armour layer of breakwater were observed during the tests. Therefore, the section was found to be hydraulically stable against the design wave conditions adopted for the design of the proposed breakwater for fishery harbour at Ajanur, Dist. Kasargod, Kerala.

Table 4: Summary of the Wave Flume Test conducted at RSWS

Name of the Project – Breakwater for fishery harbour at Ajanur in Kasaragod district, Kerala
Model Scale = 1:20, Armour Unit = 8 t Tetrapod, Toe-Berm = Stone (2 – 3 t)
DWL = +2.60 m, HHWL = +1.40 m, MSL = +1.00 m, MLLW = +0.40 m
Test Duration = 1 hour (3.39 Hrs Proto), Bed Level = -4.50 m
Spectrum - Pierson-Moskowitz Spectrum

Sr. No	Water Level	Wave Height	Splashing	Over-topping	Run-up	Run-down	Damage		Remark	Photograph No.
							Toe-berm	Armour		
Random Wave Tests										
1	DWL	H_s = 4.05 m	Moderate	Nil	N.A.	N.A.	Nil	Nil		3
2	DWL	H_s = 4.85 m	Moderate	Nil	N.A.	N.A.	Nil	Nil	Endurance Test	3
3	MHHW	H_s = 4.8 m	Nil	Nil	N.A.	N.A.	Nil	Nil		4
4	MSL	H_s = 3.97 m	Nil	Nil	N.A.	N.A.	Nil	Nil		5
5	MLLW	H_s = 3.76 m	Nil	Nil	N.A.	N.A.	Nil	Nil		6
Regular Wave Tests										
6	DWL	H_{SI} = 5.0 m	Moderate	Minor	Upto +5.85 m	Upto +0.72 m	Nil	Nil	T = 10 sec	7
7	MHHW	H_{SI} = 5.02 m	Minor	Nil	Upto +5.8 m	Upto +0.15 m	Nil	Nil	T = 12 sec	8
8	MHHW	H_{SI} = 5.0 m	Nil	Nil	Upto +5.10 m	Upto [-]0.30 m	Nil	Nil	T = 10 sec	9
9	MHHW	H_{SI} = 5.0 m	Nil	Nil	Upto +4.25 m	Upto +1.0 m	Nil	Nil	T = 8 sec	10
10	MSL	H_{SI} = 5.07 m	Nil	Nil	Upto +3.50 m	Upto [-]0.50 m	Nil	Nil	T = 10 sec	11
11	MLLW	H_{SI} = 4.80 m	Nil	Nil	Upto +3.50 m	Upto [-]1.32 m	Nil	Nil	T = 10 sec	12

7.0 RECOMMENDED CROSS-SECTIONS OF THE BREAKWATER

After conducting several tests, the cross-section of the breakwater at -4.50 m bed level was found stable against various wave conditions. The details of the cross-section of the breakwater at various bed levels are as follows:

1)Trunk Portion at -2.0 m Bed Level (to be adopted from -2.0 m to +0.0 m Bed level)

The cross-section is designed for the -2.0 m bed level as shown in Fig. 3. This cross-section may be adopted from -2.0 m to +0.0 m bed level range. The cross-section of the breakwater consists of 2 t tetrapods provided in the armour layer with 1:2 slope on the sea-side from el. +2.20 m to +7.0 m and 0.5 to 1.0 t stones provided in the armour with 1:2 slope on the leeside. A 4.0 m wide toe-berm on the seaside consists of 0.5 to 1 t stones is kept at el. +2.20 m. Secondary layer consists of 200 to 300 kg stones provided below the armour layer and 50 to 100 kg stones provided below the toe-berm and leeside armour. Core consists of 20 to 50 kg stones and 0.30 m thick bedding layer consists of stones up to 20 kg. A PCC crest of 0.5 m thick is provided at el. +6.50 m soffit level with sea-side parapet top at el. +8.0 m. A clear carriageway width of 7 m is provided on the crest slab for the movement of vehicles / machineries in future during the inspection / supervision or maintenance purpose.

2) Trunk Portion at -4.50 m Bed Level (to be adopted from -2.0 m to -4.50 m Bed level)

The cross-section of breakwater at -4.50 m bed level is shown in Fig. 4. The cross-section of the breakwater consists of 6 t tetrapods provided in the armour layer with 1:2 slope on the sea-side from el. +0.0 m to +7.0 m and 1 to 2 t stones provided in the armour with 1:2 slope on the leeside. A 6.0 m wide toe-berm on seaside is kept at el. +0.0 m consists of 2 to 3 t stones. The secondary layer consists of 0.5 to 1.0 t stones provided below the armour layer and 200 to 300 kg stones provided below the toe-berm and 100 to 200 kg stones provided below the leeside armour. Core consists of 20 to 100 kg stones and 0.30 m thick bedding layer consists of stones up to 20 kg is provided at

-4.50 m bed level. A 7.0 m wide PCC crest slab of 0.5 m thick is provided at el. +5.50 m soffit level with sea-side parapet top at el. +8.0 m.

3) Roundhead at -4.50 m Bed Level

The cross-section and plan of roundhead portion of breakwater at -4.50 m bed level are shown in Figs. 5 & 6 respectively. The section consists of 8 t tetrapods placed in the armour (double layer) on 1:2 slope and are supported with the 6.0 m wide toe-berm consisting of 3 to 4 t stones at el. +0.0 m. A 8.0 m wide PCC crest slab is provided with top el. +8.0 m. A clear carriageway width of 6 m is provided on the crest slab for the movement of vehicles / machineries in future during the inspection / supervision or maintenance purpose. Secondary layer consists of 0.5 to 1.0 t stones provided below the armour layer and below the toe-berm. Core consists of 20-100 kg stones. A 0.3 m thick bedding layer is provided with stones upto 20 kg.

8.0 CONCLUDING REMARKS AND RECOMMENDATIONS

Based on the desk and the wave flume studies carried out for design of the breakwater for fishery harbour at Ajanur in Kasargod District, Kerala, the following concluding remarks are drawn:

1. The recommended cross-section of the breakwater with tetrapods in the armour layer is shown in Fig. 3 to Fig. 6. The cross section is hydraulically stable under the design wave conditions & therefore, recommended to implement at the proposed site.
2. The end of the breakwater should be protected by providing proper roundhead as shown in Figs. 5 & 6. The construction phasing may be adhered, in order to have a safety and economy of the project. If, the construction of the breakwater may not be possible during one season, as such, a temporary roundhead at the end portion may be provided wherever the work is curtailed.
3. The density of concrete and stones to be used for construction of the breakwater should be about 2.4 t / m^3 and 2.6 t / m^3, respectively.

4. There should not be any deviation from the design during the construction of the breakwater in respect of levels, slopes and weights of the stones.

5. The crest slab and the parapet wall provided at the crest of the breakwater may be constructed monolithically.

6. The packing density of the 2 t Tetrapods, 6 t Tetrapods and 8 t Tetrapods (double layer) in the armour layer of breakwater is 117 Nos., 56 Nos. and 47 Nos. per 100 sq. m. of area. The specification of 2 t Tetrapods, 6 t Tetrapods and 8 t Tetrapods are enclosed as Annexure-II, III and IV respectively.

7. All levels of the proposed breakwater should be correlated with Chart Datum before construction at the site.

8. The grading of the stones to be used in the construction for the breakwater should be as follows :

2 – 3 t stones	-	50% stones should be higher than 2.50 t
1 – 2 t stones	-	50% stones should be higher than 1.50 t
0.5 – 1 t stones	-	50% stones should be higher than 0.75 t
200 – 300 kg stones	-	50% stones should be higher than 250 kg
100 – 200 kg stones	-	50% stones should be higher than 150 kg
20 – 100 kg stones	-	75% stones should be higher than 60 kg

9. The rubble mound structures are flexible structures and it is essential to monitor and maintain them regularly. Therefore, periodic survey of the breakwater and maintenance of the breakwater, as and when any damage occurs may be undertaken.

10. It is suggested to carry out geotechnical investigations to check the probable sinkage at the site before the construction of the breakwater.



Fig. 1: Index and Location Map of Ajanur, Kasargod District, Kerala.



Fig. 2: Layout Plan for Proposed Fishing Harbour at Ajanur, Kasargod District, Kerala

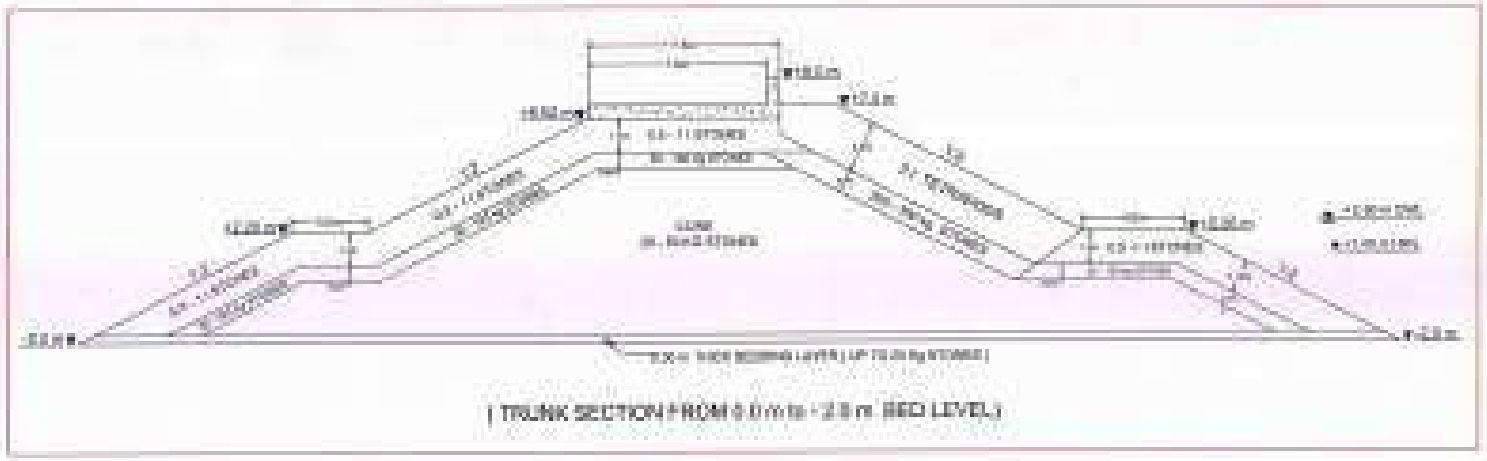


Fig. 3: Design Cross-Section of Breakwater at -2.0 m Bed Level at Ajanur, Kasargod District, Kerala

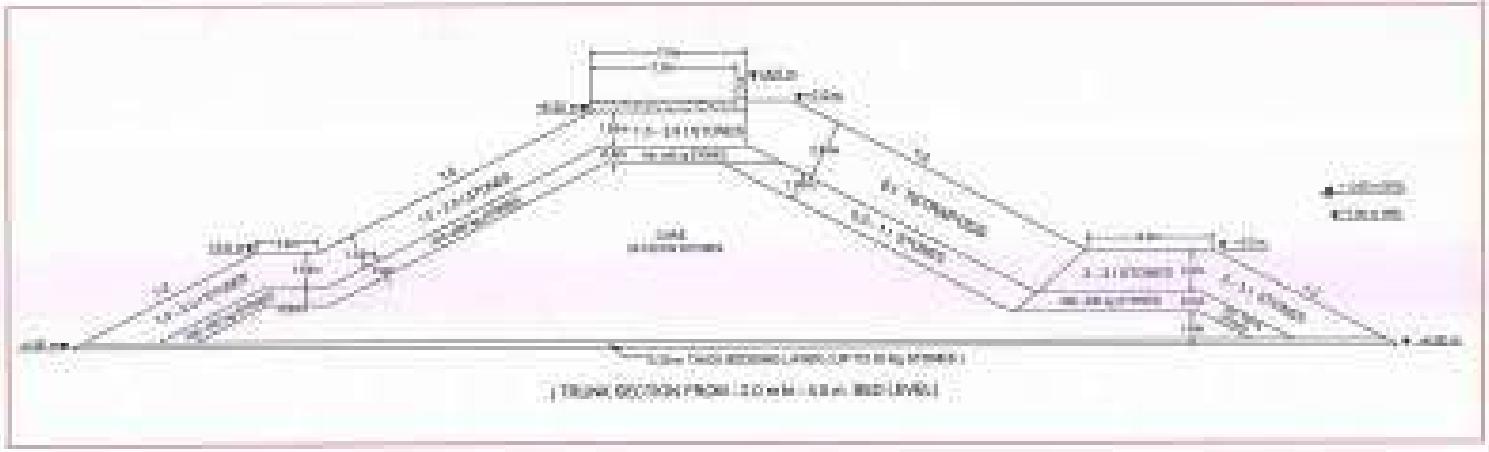


Fig. 4: Design Cross-Section of Breakwater at -4.50 m Bed Level at Ajanur, Kasargod District, Kerala

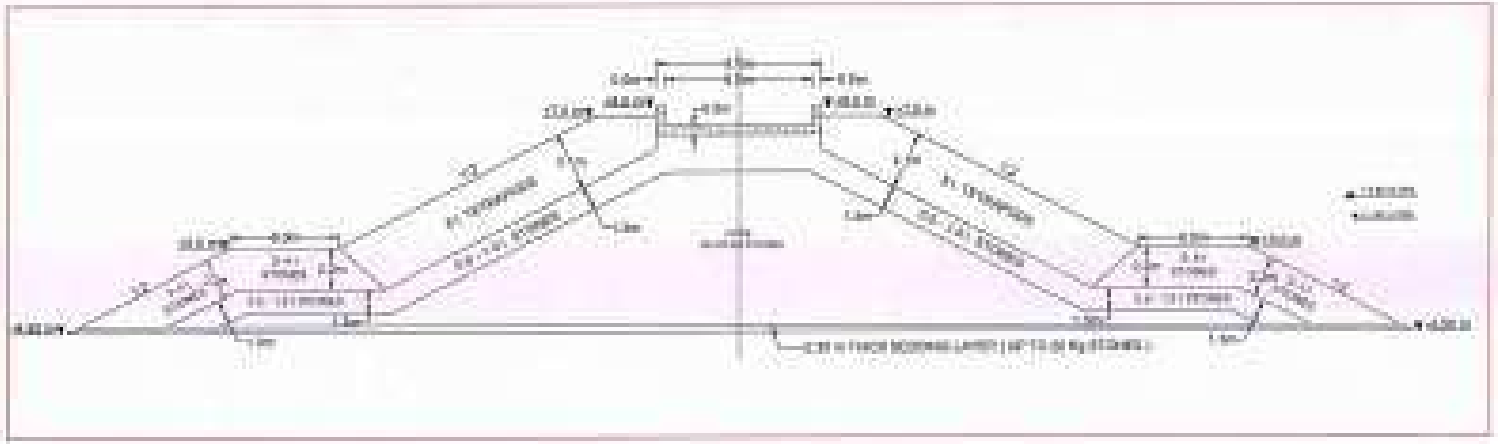


Fig. 5: Roundhead Section of Breakwater at -4.50 m Bed Level at Ajanur, Kasargod District, Kerala

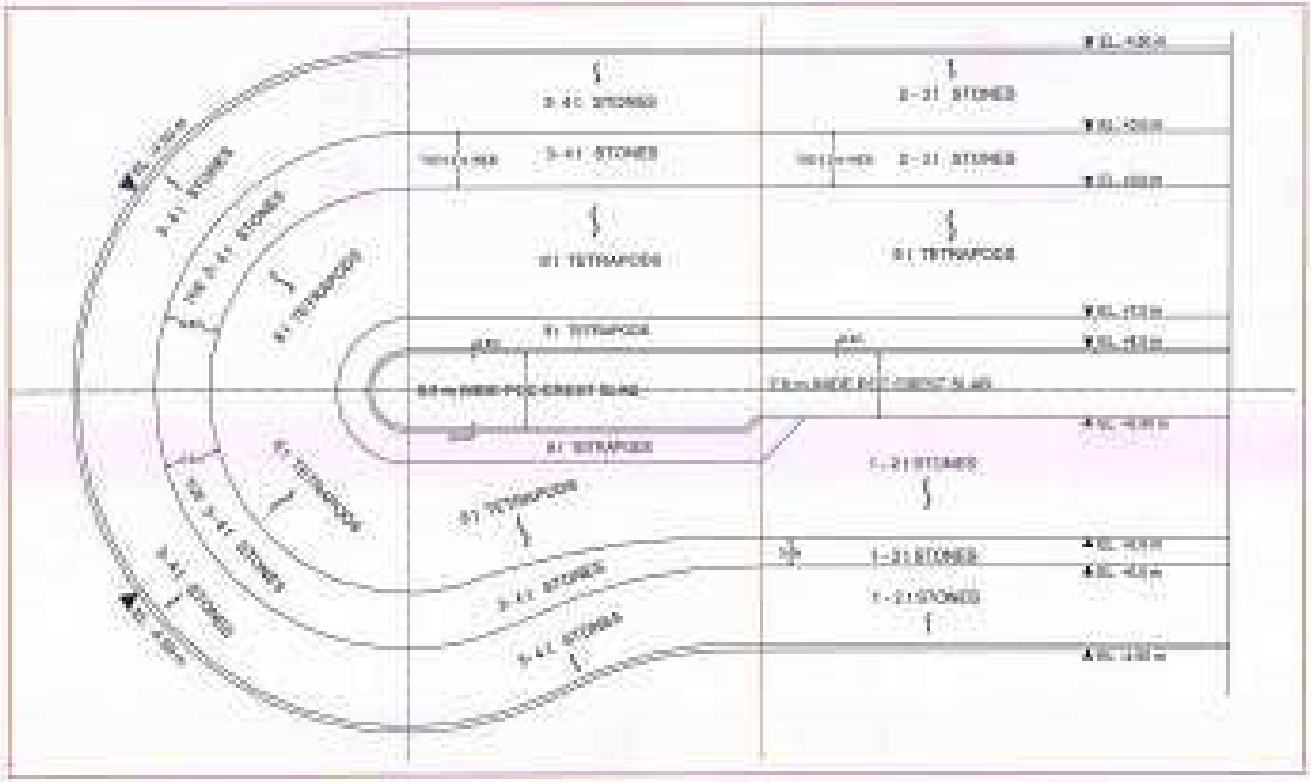
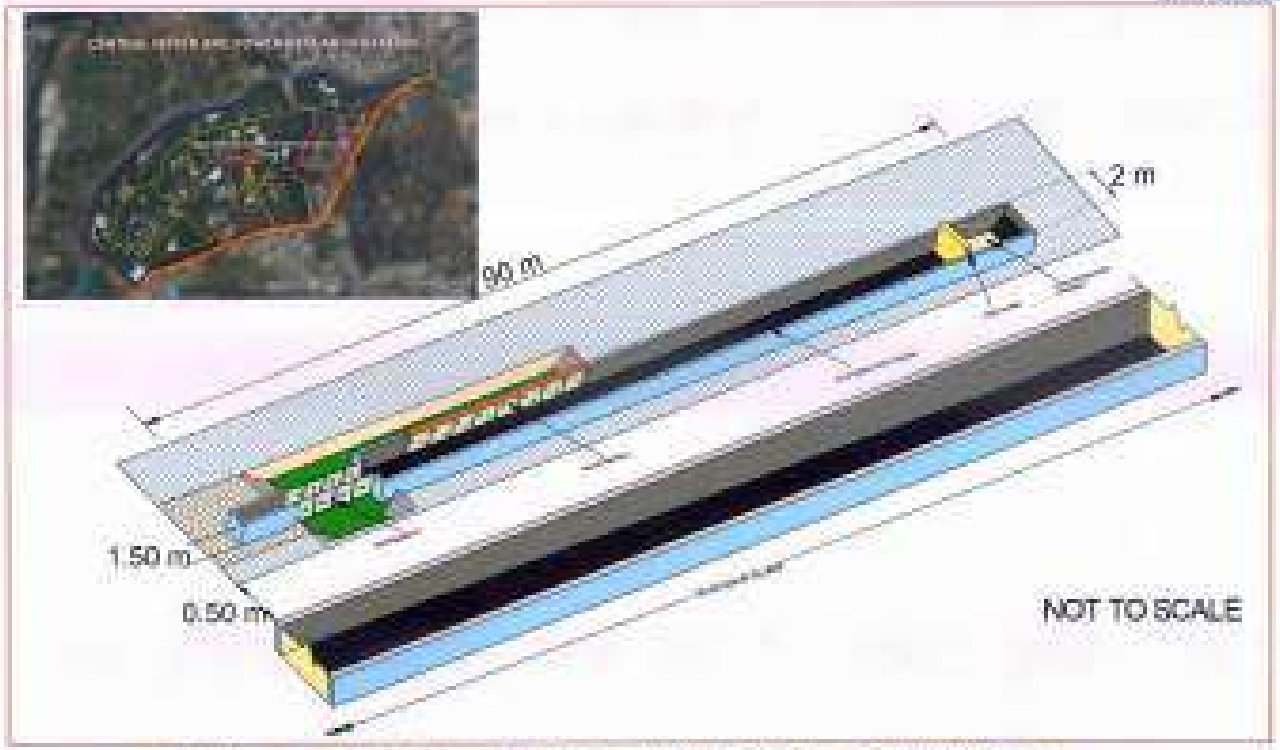


Fig. 6: Plan of Roundhead portion of Breakwater at -4.50 m Bed Level at Ajanur, Kasargod District, Kerala

Annexure I



Random Sea Wave Generation Flume (90 m) Facility at CWPRS, Pune

Annexure – II

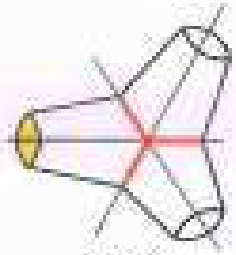
TETRAPOD SPECIFICATION

For 2 T Tetrapod

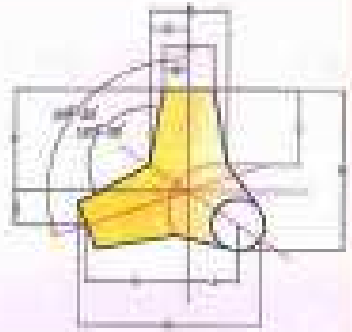
Wt. of Tetrapod	W =	2	T
Density of Concrete	w =	2.4	Ton. m
Vol. of Tetrapod	V =	0.833	Cu. meter
Overall dim. of Tetrapod	H =	1.455	meter

Dimensions of Armour Units in meter

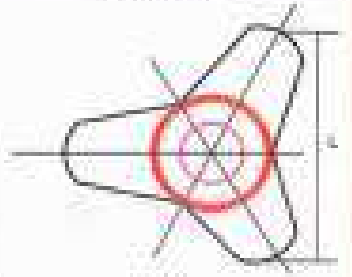
A	0.392*H	0.42
B	0.151*H	0.22
C	0.472*H	0.68
D	0.472*H	0.67
E	0.235*H	0.34
F	0.644*H	0.93
G	0.215*H	0.31
I	0.686*H	0.97
J	0.392*H	0.42
K	1.081*H	1.56
L	1.261*H	1.72



BOTTOM



ELEVATION



PLAN

Armour layer thickness (3 Units) = 1.261 * H (Double Layer)
i.e = 1.900 meter

Placing Density (N)

Number Of Tetrapods (Two Layers, Random Placed) Per Unit Area

N = n * 10^4 * (1-P/100) * (gW)^2/3

Where,

Layer coeff.	K? =	1.04	constant	N =	1.724 per sq. m. area
Porosity	P=	50	%	N =	147 per 100 sq. m. area
No. of Layers	n=	2	nos.		

Specification for 2 t Tetrapod

Annexure – III

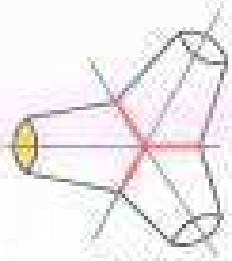
TETRAPOD SPECIFICATION

For 6 t Tetrapod

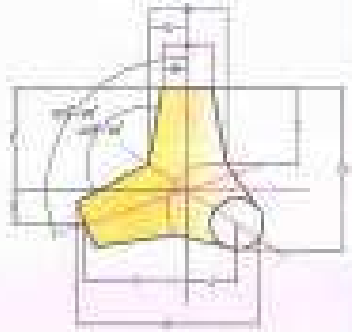
Wt. of Tetrapod	W =	6	T
Density of Concrete	w =	2.4	t/cu. m.
Vol. of Tetrapod	V =	2.500	Cu. meter
Overall dim. of Tetrapod	H =	2.000	meter

Dimensions of Armour Units in meter

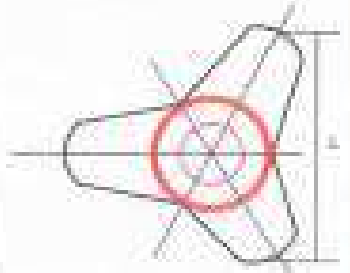
A	0.302*H	0.60
B	0.181*H	0.37
C	0.477*H	0.95
D	0.470*H	0.97
E	0.235*H	0.48
F	0.644*H	1.33
G	0.815*H	0.44
I	0.698*H	1.25
J	0.283*H	0.67
K	1.081*H	2.25
L	1.301*H	2.47



BOTTOM



ELEVATION



PLAN

Armour layer Thickness (2 Units) = 1.561 * H (Double Layer)
i.e.= 2.861 (2.9)

Placing Density (N)

Number Of Tetrapods (Two Layers, Random Placed) Per Unit Area

N = n * (1-P/100) * (w/W)**2/3

Where,

Layer coeff.	n' =	1.04	constant
Porosity	P=	50	%
No. of Layers	n=	2	nos

N = 0.1850 per sq. m. area
N = 95 per 100 sq. m. area

Specification for 6 t Tetrapod

Annexure – IV

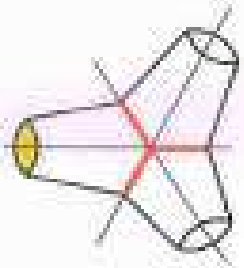
TETRAPOD SPECIFICATION

For 8 T Tetrapod

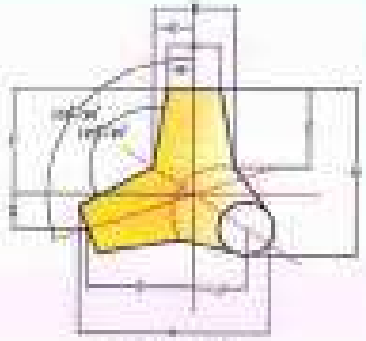
Wt. of Tetrapod	W =	8	T
Density of Concrete	w =	2.4	t/cu. m.
Vol. of Tetrapod	V =	3.333	Cu. meter
Overall dim. of Tetrapod	H =	2.264	meter

Dimensions of Armour Units in meter

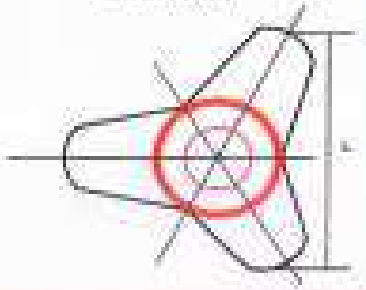
A	0.302*H	0.68
B	0.151*H	0.34
C	0.477*H	1.08
D	0.470*H	1.06
E	0.235*H	0.53
F	0.644*H	1.46
G	0.215*H	0.49
I	0.606*H	1.37
J	0.303*H	0.69
K	1.091*H	2.47
L	1.201*H	2.72



BOTTOM



ELEVATION



Armour layer Thickness (2 Units) = 1.381 * H (Double Layer)
i.e = 3.063 meter

Placing Density (N)
Number Of Tetrapods (Two Layers, Random Placed) Per Unit Area
N = n * KΔ * [1-P/100] * [w/W]^-2/3
Where,

Layer coeff.	KΔ =	1.04	constant
Porosity	P=	50	%
No. of Layers	n=	2	nos

N =	0.466	per sq. m. area
N =	47	per 100 sq. m. area

Specification for 8 t Tetrapod

Annexure - V



Photo 1: 90 m long RSWG wave flume facility at CWPRS



Photo 2: Random wave test with H_s = 4.85 m at DWL = +2.60 m



Photo 3: Random wave test with H_s = 4.85 m at DWL = +2.60 m (Endurance Test)



Photo 4: Random wave test with H_s = 4.0 m at MHHW = +1.40 m



Photo 5: Random wave test with H_s = 3.97 m at MSL = +1.00 m



Photo 6: Random wave test with H_s = 3.76 m at MLLW = +0.40 m



Photo 7: Regular wave test with H_{10} = 5.0 m at DWL = +2.60 m, t = 10 sec



Photo 8: Regular wave test with H_{10} = 5.12 m at MHHW = +1.40 m, t = 12 sec



Photo 9: Regular wave test with H_{10} = 5.0 m at MHHW = +1.40 m, t = 10 sec



Photo 10: Regular wave test with $H_{1/3}$ = 5.0 m at MHHW = +1.40 m, t = 8 sec



Photo 11: Regular wave test with $H_{1/3}$ = 5.07 m at MSL = +1.00 m, t = 10 sec



Photo 12: Regular wave test with H_0 = 4.80 m at MLLW = +0.40 m, t = 10 sec

By Speed Post

सत्यमेव जयते

भारत सरकार / Government of India
जल शक्ति मंत्रालय / Ministry of Jal Shakti
जल संसाधन, नदी विकास और गंगा संरक्षण विभाग
Department of Water Resources, River Development and Ganga Rejuvenation
केन्द्रीय जल और विद्युत अनुसंधान शाला
खड़कवासला, पुणे - 411 024
CENTRAL WATER & POWER RESEARCH STATION
Khadakwasla, Pune – 411 024

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✉:tayade.br@cwprs.gov.in
🖷:020-24381004
🖳:www.cwprs.gov.in

संख्या/No.: CHS/2024/01/141

दिनांक/Date: 09.08.2024

The Chief Engineer
Harbour Engineering Department
Kamaleswaram, Manacaud,
Thiruvananthapuram
Kerala – 695 009

Sub: Desk & wave flume studies for the design of breakwater for fishery harbor at Ajanur in Kasargod district, Kerala.

Ref: 1) Your letter No. HECE/207/2022-DR8 dated 01.08.2024
2) Discussions at CWPRS on 30.07.2024
3) CWPRS Technical Report No. 6177, November 2023

Sir,

This has a reference to the above cited correspondence regarding the desk & wave flume studies for the design of breakwater for fishery harbor at Ajanur in Kasargod district, Kerala. A request has been made to review the Technical Report (Ref. 3) to optimize the breakwater design. The possibility of optimization of the breakwater cross-sections were discussed during your visit to CWPRS on 30.07.2024. Accordingly, desk studies have been conducted considering the project requirements, and minor modifications to the breakwater cross-sections have been carried out, as shown in Figs. 1 to 4.

The modified design cross-sections of the breakwater include a revised crest width of 5.5 m instead of 7.0 m, except for the roundhead crest width, which remains at 8.0 m. In the modified cross-section for the -2.0 m bed level, the lee side armour consists of 0.5-1.0 t stones placed on a 1:1.5 slope, with a toe-berm consisting of 0.5-1.0 t stones placed at el. +0.2 m, as shown in Fig. 1. In the modified cross-section for the -4.5 m bed level, the lee side armuor consists of 1.0-2.0 t stones placed on a 1:1.5 slope, with a toe-berm consisting of 1.0-2.0 t stones placed at el. -2.55 m, as shown in Fig. 2. Minor modifications have also been made to the toe-berm portion of the roundhead. The toe-berm consists of 3.0-4.0 t

stones placed at el. -0.7 m, as shown in Fig. 3. The modified plan of the roundhead is shown in Fig. 4. All other details of the breakwater design cross-sections will remain the same as provided in CWPRS Technical Report No. 6177, November 2023.

Hope this would meet with your requirements.

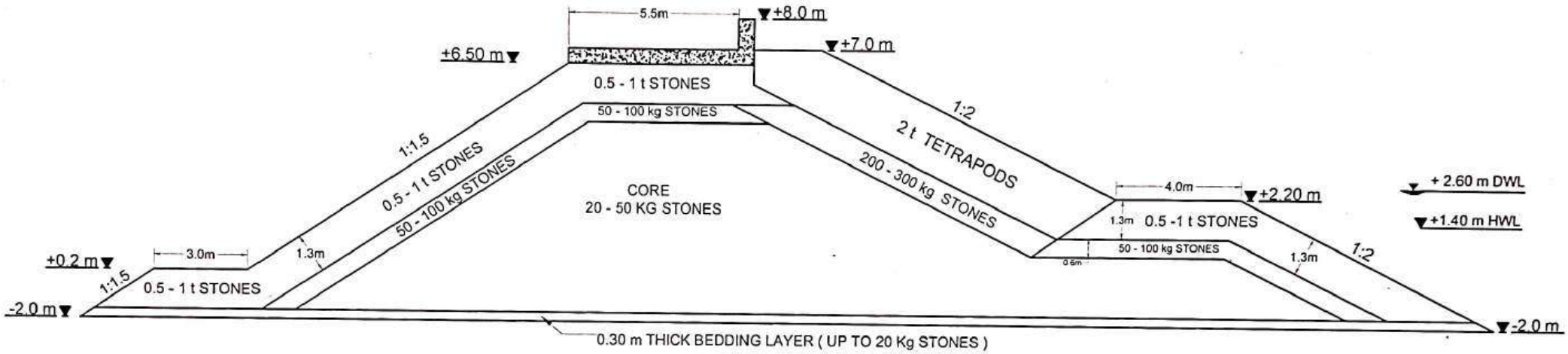
धन्यवाद,

भवदीय,

7/8/2024

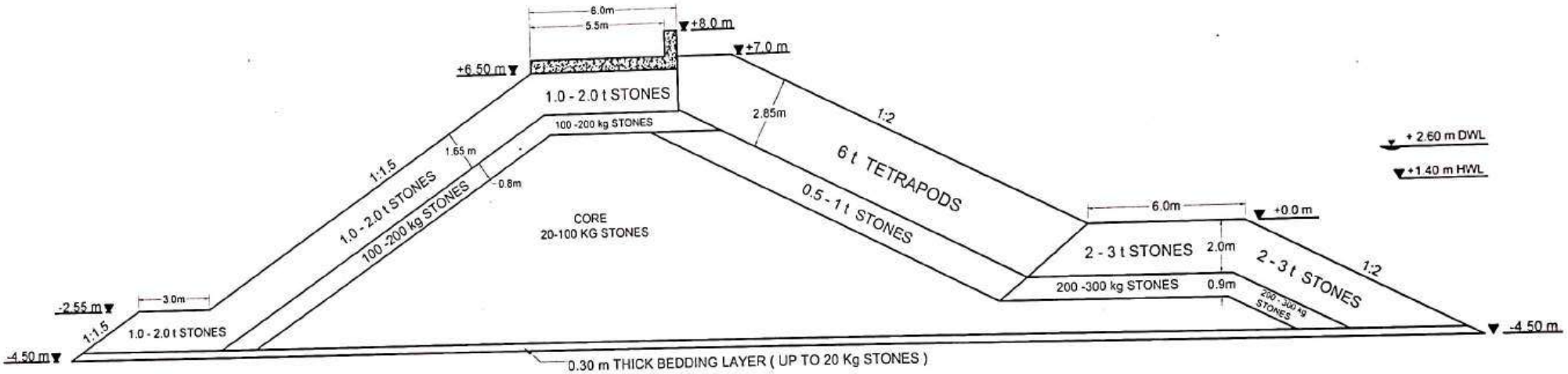
(ए वी महालिंगैया/A.V.Mahalingaiah)
वैज्ञानिक 'ई' / Scientist 'E'

"जल ही जीवन का आधार है।"



(TRUNK SECTION FROM 0.0 m to - 2.0 m BED LEVEL)

FIG 1 :- MODIFIED DESIGN CROSS -SECTION OF BREAKWATER AT -2.0 m BED LEVEL, AJANUR, KERALA



(TRUNK SECTION FROM - 2.0 m to - 4.5 m BED LEVEL)

FIG 2:- MODIFIED DESIGN CROSS-SECTION OF BREAKWATER AT - 4.50 m BED LEVEL, AJANUR, KERALA

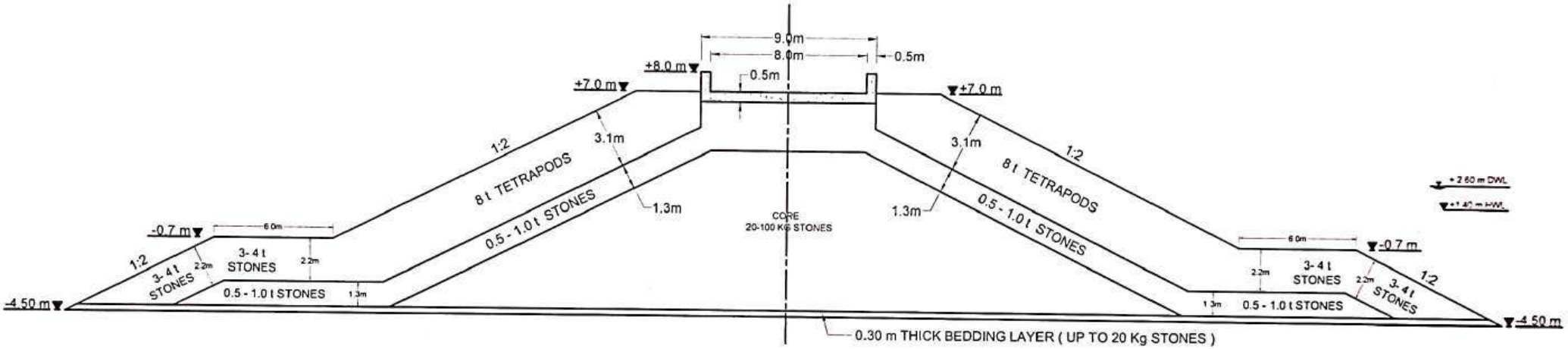


FIG 3 :- MODIFIED ROUNDHEAD CROSS-SECTION OF BREAKWATER AT -4.5 m BED LEVEL, AJANUR, KERALA

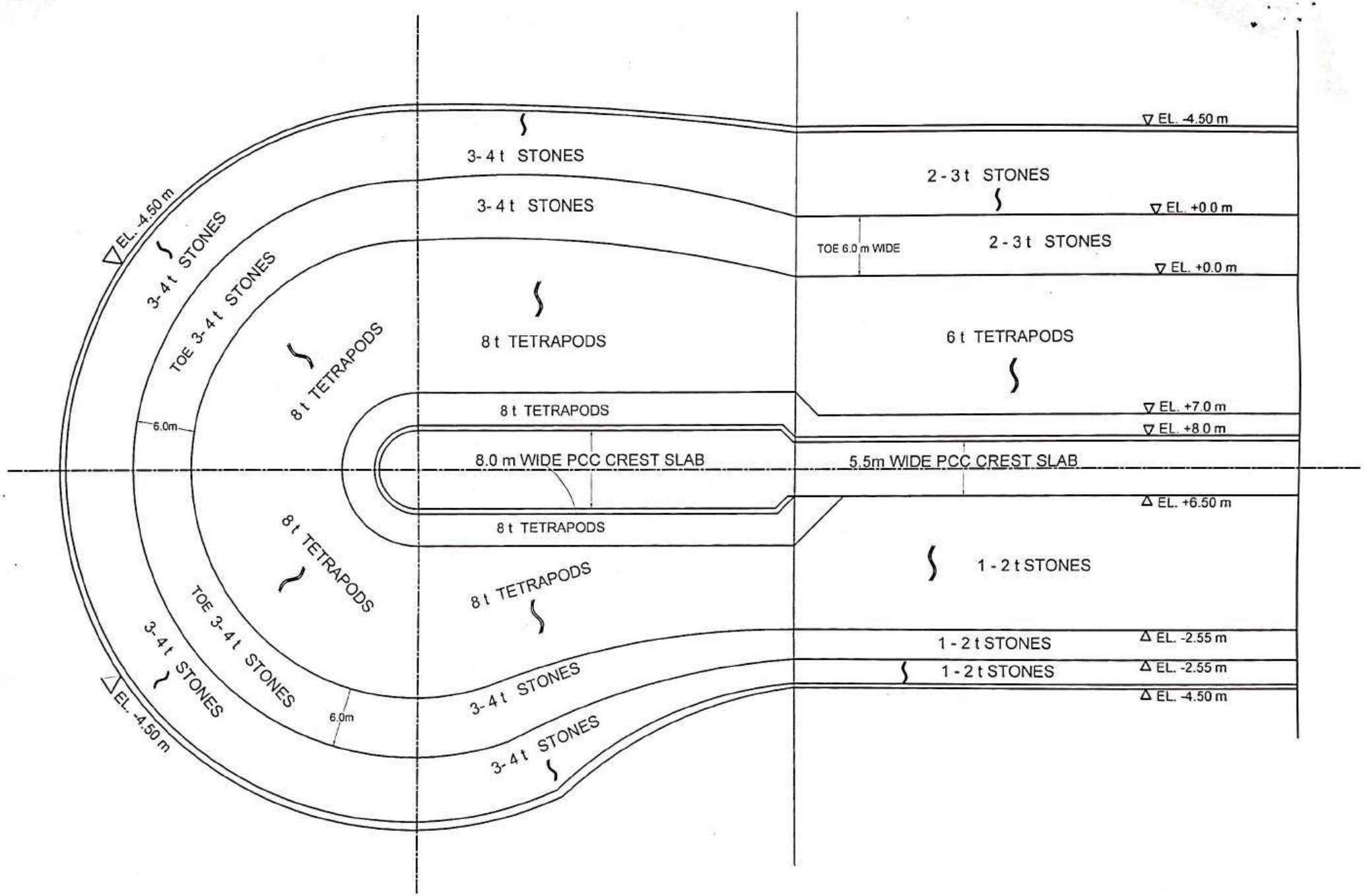


FIG 4 :- PLAN OF ROUNDHEAD SECTION OF BREAKWATER AT -4.5 m BED LEVEL, AJANUR, KERALA

GENERAL ABSTRACT

PMMSY - Construction of Ajanur Fishing Harbour - General Abstract				
Sl No	**Item**	**Quantity**	**Unit Rate in Rs**	**Amount in Rs**
1	Construction of Breakwater at Ajanoor	1575m	772063.5	1,21,60,00,000
2	Construction of river training wall and and dredging near the river training area	training wall-435m dredging- 31000 m3		32,60,00,000
3	Dredging And Construction of reclamation Bund	dredging - 132500 m3 reclamation bund- 400 m		6,24,00,000
4	Wharf and Auction Hall	Wharf - 120 m x 6.6 m , Auction Hall - 60 m x 15 m Total 1692m3	34929.1	5,91,00,000
5	Canteen, Rest shed, Locker room, Gear Shed	45 m x 10 m (two Storey)	27666.7	2,49,00,000
6	Compound wall and Side Protection Works	compound wall- 510 m side protection- 1710 m		6,14,00,000
7	Gate and Gate House	2.4 m x 2.4 m ATM and Toll Booth each (area 47.16m2)	38167.9	18,00,000
7	Internal Road, Parking area and Drainage facility	Parking Area - 4320 sqm	3873.6	2,82,00,000
		Internal Road - 740*4 m		
8	Toilet Block	13.3*5	37594.0	25,00,000
9	Construction of approach road to fishing harbour	950 m	14526.3	1,38,00,000
10	Construction of workshop building	9.8*9.8 m	48521.4	46,80,000
11	Construction of office room cum harbour surveillance camera room	14.6*22.6 m (2 storey)	26851.7	89,00,000
12	Construction of wharf for berthing facility	100*5 m	42800.0	2,14,00,000
15	OH Tank and Water Supply Arrangement	As per estimate		1,89,00,000
14	Effluent Treatment Plant	LS		35,00,000
17	Navigational Facility	LS		2,00,000
18	Pressure Washer and Cleaning equipments	LS		6,00,000
19	Landscaping, Green Belt and Rainwater Harvesting	LS		20,00,000
24	Mechanical conveyor system & Automation	LS		1,50,00,000
23	Electrification and Installation of Solar energy system	LS		2,50,00,000
			Total (A)	**1,89,62,80,000**

Smart Infrastructure and automated systems			
30	Smart Technology Investments		
30.1	Procurement and installation of smart infrastructure components, such as IoT devices, sensors, communication networks, and data management systems including cost of hardware, software, and installation services.	LS	1,00,00,000
30.2	Development or customization of software for data management, analysis and visualization	LS	50,00,000
31	Communication and Connectivity		
31.1	Deployment of communication infrastructure, including internet connectivity, satellite communication systems, and wireless networks	LS	50,00,000
31.2	Implementation of networking equipment and cybersecurity measures	LS	50,00,000
32	Safety and Security Measures		
32.1	Investment in safety equipment (distress beacons and rescue drones)	LS	50,00,000
32.2	Installation of surveillance system including CCTV camera	LS	50,00,000
35	Provide charging stations for electric vehicles	L.S	10,00,000
36	Vehilce for installing IOT devices	L.S	35,00,000
		Sub total	**3,95,00,000**
		GST @ 18%	**71,10,000**
		Sub Total including GST @ 18% (B)	**4,66,10,000**
		Sub Total (C= A+B)	**1,94,28,90,000**
		Contingencies @ 3%	**5,71,10,000**
		Grand Total	**2,00,00,00,000**
Rupees Two hundred crore only			

ESTIMATES

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of Breakwater-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Appendix A- North Breakwater- 1150m**			
1.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	8500.000cum	@210.02/cum	1785170.00
1.002	OD7023/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	33200.000tonne	@935.64/tonne	31063248.00
1.003	OD4410/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	27300.000tonne	@935.64/tonne	25542972.00

Sl No	Specification	Quantity	Rate	Amount
1.004	OD4413/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20kg to 100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	237600.000tonne	@935.64/tonne	222308064.00
1.005	OD7021/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	47400.089tonne	@935.64/tonne	44349419.27
1.006	OD7020/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	9500.018tonne	@935.64/tonne	8888596.84
1.007	OD7018/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	22600.043tonne	@1093.96/tonne	24723543.04
1.008	OD7017/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 0.5-1T and above category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	49000.087tonne	@1077.91/tonne	52817683.78
1.009	OD235/2022-2023			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1 T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings			

Sl No	Specification	Quantity	Rate	Amount
	with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site			
	Net Total	69100.130tonne	@1077.91/tonne	74483721.13
1.010	OD7158/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T - 3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	51000.088tonne	@1077.91/tonne	54973504.86
1.011	65.103			
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .			
	Net Total	3100.000each	@7537.42/each	23366002.00
1.012	65.104			
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site			
	Net Total	3100.000each	@909.34/each	2818954.00
1.013	OD7266/2023-2024			
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate			

Sl No	Specification	Quantity	Rate	Amount
	of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer			
	Net Total	7500.000each	@22383.48/each	167876100.00
1.014	OD7610/2023-2024			
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete			
	Net Total	7500.000each	@1556.05/each	11670375.00
1.015	65.124			
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.			
	Net Total	370.000each	@29749.73/each	11007400.10
1.016	65.125			
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete			
	Net Total	370.000each	@2214.51/each	819368.70
			Heading Total(Rs)	758494122.72
2	**Appendix B - Southern Breakwater- 425m**			
2.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	4300.000cum	@210.02/cum	903086.00

Sl No	Specification	Quantity	Rate	Amount
2.002	OD7147/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	12500.000tonne	@935.64/tonne	11695500.00
2.003	OD7146/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	45100.000tonne	@935.64/tonne	42197364.00
2.004	OD7145/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	56000.000tonne	@935.64/tonne	52395840.00
2.005	OD7144/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	9000.000tonne	@935.64/tonne	8420760.00
2.006	OD7143/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10 kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	6500.000tonne	@935.64/tonne	6081660.00
2.007	OD7142/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once			

Sl No	Specification	Quantity	Rate	Amount
	in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	8600.000tonne	@1093.96/tonne	9408056.00
2.008	OD7141/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 500 Kg -1T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	26600.000tonne	@1077.91/tonne	28672406.00
2.009	OD241/2022-2023			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site			
	Net Total	16400.000tonne	@1077.91/tonne	17677724.00
2.010	OD7159/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T-3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with			

Sl No	Specification	Quantity	Rate	Amount
	approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	15300.000tonne	@1077.91/tonne	16492023.00
2.011	65.103			
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .			
	Net Total	2950.000each	@7537.42/each	22235389.00
2.012	65.104			
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site			
	Net Total	2950.000each	@909.34/each	2682553.00
2.013	OD7279/2023-2024			
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer			
	Net Total	1750.000each	@22383.48/each	39171090.00
2.014	OD7611/2023-2024			
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc			

Sl No	Specification	Quantity	Rate	Amount
	complete			
	Net Total	1750.000each	@1556.05/each	2723087.50
2.015	65.124			
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.			
	Net Total	350.000each	@29749.73/each	10412405.50
2.016	65.125			
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete			
	Net Total	350.000each	@2214.51/each	775078.50
	Heading Total(Rs)			271944022.50
	Total Estimation PAC			1030438145.22
4	**Extra Charges**			
3.001	Provision for GST			
	1030438145.22		18.00%	185478866.14
	Grand Total			1215917011.36
	Round off			82988.64
	Rounded Total(Rs)			1216000000.00
	Rupees One Hundred Twenty One Crore Sixty Lakh			

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of Breakwater-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Appendix A- North Breakwater- 1150m						
1.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	Break water on the land connection area						
		1.000	100.000	50.000	(1.2+2.2)/2		8500.000
	Total						**8500.000**
						Total Quantity in cum	**8500.000**
1.002	OD7023/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	Upto 20kg stones						
	Ch 0 to 210	1.000	210.000	(13.84+14.89)/2	(2/3)*2.65		5329.425
	Ch 210 to 1150	1.000	940.000	(15.24+16.81)/2	(2/3)*2.65		26612.234
	Head portion as per calculation sheet	1.000	628.540		(2/3)*2.65		1110.423
	Rounding	1.000	147.918				147.918
	Total						**33200.000**
						Total Quantity in tonne	**33200.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.003	OD4410/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	10 to 200 Kg stones						
	Ch 210 to 1150	1.000	940.000	(15.26+17.42)/2	2/3*2.65		27135.345
	Rounding	1.000	164.655				164.655
	Total						**27300.000**
						Total Quantity in tonne	**27300.000**
1.004	OD4413/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20kg to 100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20 to 100 Kg stones						
	Ch 210 to 1150	1.000	940.000	(117.95+163.28)/2	2/3*2.65		233515.084
	Head portion as per calculation sheet	1.000	2198.950		2/3*2.65		3884.819
	Rounding	1.000	200.097				200.097
	Total						**237600.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in tonne	**237600.000**
1.005	OD7021/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20-50kg stones						
	Ch 0 to 210	1.000	210.000	(112.86+141.63)/2	(2/3)*2.65		47207.984
	Rounding	1.000	192.105				192.105
	Total						**47400.089**
						Total Quantity in tonne	**47400.089**
1.006	OD7020/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	50-100kg stones						
	Ch 0 to 210	1.000	210.000	(24.19+25.99)/2	(2/3)*2.65		9308.408
	Rounding	1.000	191.610				191.610
	Total						**9500.018**
						Total Quantity in tonne	**9500.018**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.007	OD7018/2023-2024						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	200- 300kg stones						
	Ch 0 to 210	1.000	210.000	(10.29+12.52)/2	(2/3)*2.65		4231.263
	Ch 210 to 1150	1.000	940.000	(11.03+11.03)/2	(2/3)*2.65		18317.188
	Rounding	1.000	51.592				51.592
	Total						**22600.043**
						Total Quantity in tonne	**22600.043**
1.008	OD7017/2023-2024						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 0.5-1T and above category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	500 Kg to 1T Stones						
	Ch 0 to 210	1.000	210.000	(47.5+49.84)/2	(2/3)*2.65		18056.604

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Ch 210 to 1150	1.000	940.000	(14.45+18.89)/2	(2/3)*2.65		27683.366
	Head portion as per calculation sheet	1.000	1790.050		(2/3)*2.65		3162.428
	Rounding	1.000	97.689				97.689
	Total						**49000.087**
						Total Quantity in tonne	**49000.087**
1.009	OD235/2022-2023						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1 T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site						
	1T to 2T Stones						
	Ch 210 to 1150	1.000	940.000	(39.35+43.81)/2	(2/3)*2.65		69050.650
	Rounding	1.000	49.480				49.480
	Total						**69100.130**
						Total Quantity in tonne	**69100.130**
1.010	OD7158/2023-2024						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T - 3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	2T - 3T Stones						
	Ch 300 to 1150	1.000	940.000	(28.21+28.21)/2	(2/3)*2.65		46847.495
	Head portion as per calculation sheet	1.000	2294.810		(2/3)*2.65		4054.172
	Rounding	1.000	98.421				98.421
	Total						**51000.088**
						Total Quantity in tonne	**51000.088**
1.011	65.103						
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .						
	Moulding & supplying 2T						
	Ch 0 to 210	1.000	210.000	(11.07+13.3)/2		1.196000	3060.385
	Rounding	1.000	39.615	1.000	1.000	1.000000	39.615
	Total						**3100.000**
						Total Quantity in each	**3100.000**
1.012	65.104						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site						
	Conveying 2T tetrapod						
	Quantity as per item 11	1.000	3100.000				3100.000
	Total						**3100.000**
						Total Quantity in each	**3100.000**
1.013	OD7266/2023-2024						
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer						
	Moulding & supplying 6 T						
	Ch 210 to 1150	1.000	940.000	(12+15.31)/2		0.580000	7444.706
	Rounding	1.000	55.294			1.000000	55.294
	Total						**7500.000**
						Total Quantity in each	**7500.000**
1.014	OD7610/2023-2024						
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	Conveying 6T tetrapod						
	Quantity as per item 13	1.000	7500.000				7500.000
	Total						**7500.000**
						Total Quantity in each	**7500.000**
1.015	65.124						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.						
	Moulding & Supplying 8T Tetrapods						
	Round head	1.000	3.14*12.9	18.780		0.480000	365.137
	Rounding	1.000	4.863				4.863
	Total						**370.000**
						Total Quantity in each	**370.000**
1.016	65.125						
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	Conveying 8T tetrapod						
	Quantity as per item 15	1.000	370.000				370.000
	Total						**370.000**
						Total Quantity in each	**370.000**
2	Appendix B - Southern Breakwater- 425m						
2.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	Break water on the land connection area						
		1.000	50.000	50.000	(1.2+2.2)/2		4250.000
	rounding	1.000	50.000				50.000
	Total						**4300.000**
						Total Quantity in cum	**4300.000**
2.002	OD7147/2023-2024						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	Up to 20 Kg stones						
	Ch 0 to 200	1.000	200.000	(13.84+14.89)/2	(2/3)*2.65		5075.643
	Ch 200 to 425	1.000	225.000	(15.24+16.29)/2	(2/3)*2.65		6266.599
	Head portion as per calculation sheet	1.000	594.600		(2/3)*2.65		1050.462
	Rounding	1.000	107.296	1.000	1.000		107.296
	Total						**12500.000**
						Total Quantity in tonne	**12500.000**
2.003	OD7146/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20 Kg - 50 Kg stones						
	Ch 0 to 200	1.000	200.000	(112.86+141.63)/2	(2/3)*2.65		44959.985
	rounding	1.000	140.015	1.000	1.000		140.015

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**45100.000**
						Total Quantity in tonne	**45100.000**
2.004	OD7145/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20-100kg stones						
	Ch 200 to 425	1.000	225.000	(117.95+146.87)/2	(2/3)*2.65		52633.074
	head portion as per calculation	1.000	1888.330		(2/3)*2.65		3336.056
	rounding	1.000	30.870				30.870
	Total						**56000.000**
						Total Quantity in tonne	**56000.000**
2.005	OD7144/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	50Kg - 100kg stones						
	Ch 0 to 200	1.000	200.000	(24.19+25.99)/2	(2/3)*2.65		8865.150

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	134.850				134.850
	Total						**9000.000**
						Total Quantity in tonne	**9000.000**
2.006	OD7143/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10 kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	100-200kg stones						
	Ch 200 to 425	1.000	225.000	(15.26+16.7)/2	(2/3)*2.65		6352.062
	Rounding	1.000	147.938				147.938
	Total						**6500.000**
						Total Quantity in tonne	**6500.000**
2.007	OD7142/2023-2024						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	200Kg - 300 Kg stones						
	Ch 0 to 200	1.000	200.000	(10.29+12.52)/2	(2/3)*2.65		4029.774
	Ch 200 to 425	1.000	225.000	(11.03+11.03)/2	(2/3)*2.65		4384.433

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	185.793				185.793
	Total						**8600.000**
						Total Quantity in tonne	**8600.000**
2.008	OD7141/2023-2024						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 500 Kg -1T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	500 Kg -1T Stones						
	Ch 0 to 200	1.000	200.000	(47.5+49.84)/2	(2/3)*2.65		17196.766
	Ch 200 to 425	1.000	225.000	(14.45+17.44)/2	(2/3)*2.65		6338.149
	head portion as per calculation	1.000	1667.380		(2/3)*2.65		2945.710
	rounding	1.000	119.375				119.375
	Total						**26600.000**
						Total Quantity in tonne	**26600.000**
2.009	OD241/2022-2023						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	1T-2T Stones						
	Ch 200 to 425	1.000	225.000	(39.35+42.32)/2	(2/3)*2.65		16231.943
	Rounding	1.000	168.057				168.057
	Total						**16400.000**
						Total Quantity in tonne	**16400.000**
2.010	OD7159/2023-2024						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T-3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	2-3T Stones						
	Ch 200 to 425	1.000	225.000	(28.21+28.21)/2	(2/3)*2.65		11213.496
	Head portion as per calculation sheet	1.000	2213.980		(2/3)*2.65		3911.372
	rounding	1.000	175.132				175.132
	Total						**15300.000**
						Total Quantity in tonne	**15300.000**
2.011	65.103						
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Moulding & supplying 2T						
	Ch 0 to 200	1.000	200.000	(11.07+13.3)/2		1.196000	2914.652
	Rounding	1.000	35.348	1.000		1.000000	35.348
	Total						**2950.000**
						Total Quantity in each	**2950.000**
2.012	65.104						
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site						
	Conveying 2T tetrapod						
	Quantity as per item 11	1.000	2950.000				2950.000
	Total						**2950.000**
						Total Quantity in each	**2950.000**
2.013	OD7279/2023-2024						
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer						
	Moulding & supplying 6T						
	Ch 200 to 425	1.000	225.000	(12+14.2)/2		0.580000	1709.550
	Ch 350 to 435	1.000	40.450				40.450
	Total						**1750.000**
						Total Quantity in each	**1750.000**
2.014	OD7611/2023-2024						
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	conveying 6T tetrapod						
	Quantity as per item 13	1.000	1750.000				1750.000
	Total						**1750.000**
						Total Quantity in each	**1750.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
2.015	65.124						
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.						
	Moulding & supplying 8T						
	Round head	1.000	3.14*12.4	17.660		0.480000	330.053
	rounding	1.000	19.947	1.000	1.000	1.000000	19.947
	Total						**350.000**
						Total Quantity in each	**350.000**
2.016	65.125						
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	conveying 8T tetrapod						
	Quantity as per item 15	1.000	350.000				350.000
	Total						**350.000**
						Total Quantity in each	**350.000**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of River training work and Dredging near the river training area-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Appendix A -River training work-435m**			
1.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	4250.000cum	@210.02/cum	892585.00
1.002	OD5423/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	12550.022tonne	@935.64/tonne	11742302.58
1.003	OD5426/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	58500.110tonne	@935.64/tonne	54735042.92

Sl No	Specification	Quantity	Rate	Amount
1.004	OD5425/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20kg to 100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	44300.078tonne	@935.64/tonne	41448924.98
1.005	OD5427/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	11600.022tonne	@935.64/tonne	10853444.58
1.006	OD5428/2024-2025			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges			

Sl No	Specification	Quantity	Rate	Amount
	etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	8700.017tonne	@1093.96/tonne	9517470.60
1.007	OD5424/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	5000.000tonne	@935.64/tonne	4678200.00
1.008	OD5429/2024-2025			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 0.5-1T and above category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	30300.052tonne	@1077.91/tonne	32660729.05
1.009	OD5430/2024-2025			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1 T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings			

Sl No	Specification	Quantity	Rate	Amount
	with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site			
	Net Total	12700.024tonne	@1077.91/tonne	13689482.87
1.010	OD5431/2024-2025			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T - 3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	12700.016tonne	@1077.91/tonne	13689474.25
1.011	65.103			
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .			
	Net Total	3800.000each	@7537.42/each	28642196.00
1.012	65.104			
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site			
	Net Total	3800.000each	@909.34/each	3455492.00
1.013	OD5432/2024-2025			
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate			

Sl No	Specification	Quantity	Rate	Amount
	of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer			
	Net Total	1350.000each	@22383.48/each	30217698.00
1.014	OD5433/2024-2025			
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete			
	Net Total	1350.000each	@1556.05/each	2100667.50
1.015	65.124			
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.			
	Net Total	350.000each	@29749.73/each	10412405.50
1.016	65.125			
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete			
	Net Total	350.000each	@2214.51/each	775078.50
	Heading Total(Rs)			269511194.33
2	**Appendix B- Dredging near river training area**			
2.001	65.82			
	Deepening the harbour basin and mouth by using dredger having a flow rate of 700 to 1000m3 slurry per hour with a solid output of not less than 127.5 m3/hour and dumping the spoil at location already pointed out by the departmental officers with a lead up to a radial distance of 500m, including hire charges of dredger, all tools and plants and accesories , fuel charges, idling and mobilisation charges, providing and shifting the pipe lines including all labour charges, incidental charges etc. and drtvice			

Sl No	Specification	Quantity	Rate	Amount
	taxes complete for a depth upto (-) 4.50m bedlevel with a tolerance of +/- 20cm. Unexpected Error occured Please Login again!! Click here to Login			
	Net Total	31000.000cum	@182.57/cum	5659670.00
			Heading Total(Rs)	5659670.00
			Total Estimation PAC	275170864.33
Sl No	**Description**		**Percentage/LS**	**Amount**
3	**Lumsum Heading**			
3.001	LS provision for part TS			
		null	null%	500000.00
			Total Lumsum Amount	500000.00
4	**Extra Charges**			
3.001	Provision for GST			
		275170864.33	18.00%	49530755.58
			Grand Total	325201619.91
			Round off	798380.09
			Rounded Total(Rs)	326000000.00
	Rupees Thirty Two Crore Sixty Lakh			

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of River training work and Dredging near the river training area-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Appendix A -River training work-435m						
1.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	River Training work						
		1.000	50.000	50.000	(1.2+2.2)/2		4250.000
	Total						**4250.000**
						Total Quantity in cum	**4250.000**
1.002	OD5423/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	Upto 20 kg stones						
	Ch 0 to 260	1.000	260.000	(13.84+14.89)/2	2/3*2.65		6598.336
	Ch 260 to 435	1.000	175.000	(15.24+16.29)/2	2/3*2.65		4874.022
	Head As per calculation sheet	1.000	594.600		2/3*2.65		1050.462
	Rounding	1.000	27.202				27.202
	Total						**12550.022**
						Total Quantity in tonne	**12550.022**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.003	OD5426/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20 - 50 kg stones						
	Ch 0 to 260	1.000	260.000	(112.86+ 141.63)/2	2/3*2.65		58447.980
	Rounding	1.000	52.130				52.130
	Total						**58500.110**
						Total Quantity in tonne	**58500.110**
1.004	OD5425/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20kg to 100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20 to 100 Kg Stones						
	Ch 260 to 435	1.000	175.000	(117.95+ 146.87)/2	2/3*2.65		40936.836
	Head portion as per calculation sheet	1.000	1888.330		2/3*2.65		3336.056
	Rounding	1.000	27.186				27.186
	Total						**44300.078**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in tonne	**44300.078**
1.005	OD5427/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	50 to 100 Kg						
	Ch 0 to 260	1.000	260.000	(24.19+25.99)/2	2/3*2.65		11524.695
	Rounding	1.000	75.327				75.327
	Total						**11600.022**
						Total Quantity in tonne	**11600.022**
1.006	OD5428/2024-2025						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	200 to 300 Kg stones						
	Ch 0 to 260	1.000	260.000	(10.29+12.52)/2	2/3*2.65		5238.707
	Ch 260 to 435	1.000	175.000	(11.03+11.03)/2	2/3*2.65		3410.115

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Rounding	1.000	51.195				51.195
	Total						**8700.017**
						Total Quantity in tonne	**8700.017**
1.007	OD5424/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	10- 200 kg Stone						
	Ch 260 to 435	1.000	175.000	(15.26+16.7)/2	2/3*2.65		4940.493
	Rounding	1.000	59.507				59.507
	Total						**5000.000**
						Total Quantity in tonne	**5000.000**
1.008	OD5429/2024-2025						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 0.5-1T and above category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	500 to 1 T						
	Ch 0 to 260	1.000	260.000	(47.5+49.84)/2	2/3*2.65		22355.796
	Ch 260 to 435	1.000	175.000	(14.45+17.44)/2	2/3*2.65		4929.672

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Head As per calculation sheet	1.000	1667.380		2/3*2.65		2945.710
	Rounding	1.000	68.874				68.874
	Total						**30300.052**
						Total Quantity in tonne	**30300.052**
1.009	OD5430/2024-2025						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1 T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site						
	1 T to 2 T						
	Ch 260 to 435	1.000	175.000	(39.35+42.32)/2	2/3*2.65		12624.845
	Rounding	1.000	75.179				75.179
	Total						**12700.024**
						Total Quantity in tonne	**12700.024**
1.010	OD5431/2024-2025						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T - 3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	2 T to 3 T						
	Ch 260 to 435	1.000	175.000	(28.21+28.21)/2	2/3*2.65		8721.608
	Head as per calculation sheet	1.000	2213.980		2/3*2.65		3911.372
	Rounding	1.000	67.036				67.036
	Total						**12700.016**
						Total Quantity in tonne	**12700.016**
1.011	65.103						
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .						
	Moulding & Supplying 2T						
	Ch 0 to 260	1.000	260.000	(11.07+13.3)/2		1.196000	3789.048
	Rounding	1.000	10.952				10.952
	Total						**3800.000**
						Total Quantity in each	**3800.000**
1.012	65.104						
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site						
	Conveying 2T tetrapod						
	Quantity as per item 11	1.000	3800.000				3800.000
	Total						**3800.000**
						Total Quantity in each	**3800.000**
1.013	OD5432/2024-2025						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer						
	Moulding & supplying 6 T						
	Ch 260 to 435	1.000	175.000	(12+14.2) /2		0.580000	1329.650
	Rounding	1.000	20.350				20.350
	Total						**1350.000**
						Total Quantity in each	**1350.000**
1.014	OD5433/2024-2025						
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	Conveying 6T tetrapod						
	Quantity as per item 13	1.000	1350.000				1350.000
	Total						**1350.000**
						Total Quantity in each	**1350.000**
1.015	65.124						
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.						
	Moulding & Supplying 8T Tetrapods						
	Round Head	1.000	3.14*12.4	17.660		0.480000	330.053
	Rounding	1.000	19.947				19.947
	Total						**350.000**
						Total Quantity in each	**350.000**
1.016	65.125						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	Conveying 8T tetrapod						
	Quantity as per item 15	1.000	350.000				350.000
	Total						**350.000**
						Total Quantity in each	**350.000**
2	Appendix B- Dredging near river training area						
2.001	65.82						
	Deepening the harbour basin and mouth by using dredger having a flow rate of 700 to 1000m3 slurry per hour with a solid output of not less than 127.5 m3/hour and dumping the spoil at location already pointed out by the departmental officers with a lead up to a radial distance of 500m, including hire charges of dredger, all tools and plants and accesories , fuel charges, idling and mobilisation charges, providing and shifting the pipe lines including all labour charges, incidental charges etc. and drtvice taxes complete for a depth upto (-) 4.50m bedlevel with a tolerance of +/- 20cm. Unexpected Error occured Please Login again!! Click here to Login						
	Deepening and Dredging						
	Area between 0 and -1	1.000	7745.080		(3+2)/2		19362.700
	Area between -1 and -2	1.000	5106.141		(2+1)/2		7659.212
	Area between -2 and -3	1.000	7871.094		(1+0)/2		3935.547
	Rounding	1.000	42.541				42.541
	Total						**31000.000**
						Total Quantity in cum	**31000.000**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Dredging And Construction of reclamation Bund-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Dredging**			
1.001	60.7.1			
	DRY RUBBLE MASONRY _ Dry rubble without concrete levelling course masonry with good quality blasted rubble including packing to compactness to lines and levels cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site			
	Net Total	5720.000cum	@3426.06/cum	19597063.20
1.002	OD204/2022-2023			
	Supplying and laying Geotextile (120 grams per sqm membrane) in two layers including joints by stitching, over lapping etc. over sand bag to the land side of the bund including all cost of materials and labour charges etc. complete as per the directions of the departmental officers at site.			
	Net Total	2200.000sqm	@85.11/sqm	187242.00
1.003	65.82			
	Deepening the harbour basin and mouth by using dredger having a flow rate of 700 to 1000m3 slurry per hour with a solid output of not less than 127.5 m3/hour and dumping the spoil at location already pointed out by the departmental officers with a lead up to a radial distance of 500m, including hire charges of dredger, all tools and plants and accesories , fuel charges, idling and mobilisation charges, providing and shifting the pipe lines including all labour charges, incidental charges etc. and drtvice taxes complete for a depth upto (-) 4.50m bedlevel with a tolerance of +/- 20cm. Unexpected Error occured Please Login again!! Click here to Login			
	Net Total	132500.000cum	@182.57/cum	24190525.00
1.004	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	55.526cum	@9237.20/cum	512904.77
1.005	OD5553/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	4159.320kilogram	@96.62/kilogram	401873.50
			Heading Total(Rs)	44889608.47
2	**Reclamation bund**			
2.001	11.1.5			
	Excavation for Structures Earthwork in excavation for structures as per drawing and technical specifications Clause 305.1 including setting out, construction of shoring and bracing, removal of stumps and other deleterious material and disposal upto a lead of 50 m, dressing of sides and bottom and backfilling in trenches with excavated suitable material. V. Marshy soil			
	Net Total	4800.000cum	@1407.08/cum	6753984.00
2.002	12.11			
	Providing and laying filter media with granular crushed aggregates as per specification to a thickness of not less than 600 mm with smaller size towards the soil and bigger size towards the wall and providing over the entire surface behind abutment, wing wall, return wall to the full height, compacted to firm condition complete as per drawing and technical specification Clause 1204.3.8			
	Net Total	360.000cum	@3435.35/cum	1236726.00
			Heading Total(Rs)	7990710.00
			Total Estimation PAC	52880318.47
4	**Extra Charges**			
3.001	Provision for GST			
	52880318.47		18.00%	9518457.32
			Grand Total	62398775.79
			Round off	1224.21
			Rounded Total(Rs)	62400000.00
	Rupees Six Crore Twenty Four Lakh			

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Dredging And Construction of reclamation Bund-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Dredging						
1.001	60.7.1						
	DRY RUBBLE MASONRY _ Dry rubble without concrete levelling course masonry with good quality blasted rubble including packing to compactness to lines and levels cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site						
	DR						
	protection wall along the basin	1.000	400.000	(4+1.2)/2	5.500		5720.000
	Total						**5720.000**
						Total Quantity in cum	**5720.000**
1.002	OD204/2022-2023						
	Supplying and laying Geotextile (120 grams per sqm membrane) in two layers including joints by stitching, over lapping etc. over sand bag to the land side of the bund including all cost of materials and labour charges etc. complete as per the directions of the departmental officers at site.						
	geotextile						
	protection wall along the basin	1.000	400.000		5.500		2200.000
	Total						**2200.000**
						Total Quantity in sqm	**2200.000**
1.003	65.82						
	Deepening the harbour basin and mouth by using dredger having a flow rate of 700 to 1000m3 slurry per hour with a solid output of not less than 127.5 m3/hour and dumping the spoil at location already pointed out by the departmental officers with a lead up to a radial distance of 500m, including hire charges of dredger, all tools and plants and accesories , fuel charges, idling and mobilisation charges, providing and shifting the pipe lines including all labour charges, incidental charges etc. and drtvice taxes complete for a depth upto (-) 4.50m bedlevel with a tolerance of +/- 20cm. Unexpected Error occured Please Login again!! Click here to Login						
	Deepening and Dredging						
	Area between 0 and -1	1.000	30265.610		(3+2)/2		75664.025
	Area between -1 and -2	1.000	25704.216		(2+1)/2		38556.324
	Area between -2 and -3	1.000	36368.372		(1+0)/2		18184.186

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Rounding	1.000	95.465				95.465
	Total						**132500.000**
						Total Quantity in cum	**132500.000**
1.004	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	belt and guard stone works						
	rcc belt along basin	1.000	400.000	1.150	0.100		46.000
	guard stones along basin; 2m c/c	201.000	0.200	0.200	0.600	1.000000	4.824
	Rounding	4.702	1.000	1.000	1.000	1.000000	4.702
	Total						**55.526**
						Total Quantity in cum	**55.526**
1.005	OD5553/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR						
	Steel						
	rcc belt along basin	1.000	400.000	1.150	0.100	80.000000	3680.000
	guard stones along basin; 2m c/c	201.000	0.200	0.200	0.600	80.000000	385.920
	Rounding	0.934	1.000	1.000	1.000	100.000000	93.400
	Total						**4159.320**
						Total Quantity in kilogram	**4159.320**
2	Reclamation bund						
2.001	11.1.5						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Excavation for Structures Earthwork in excavation for structures as per drawing and technical specifications Clause 305.1 including setting out, construction of shoring and bracing, removal of stumps and other deleterious material and disposal upto a lead of 50 m, dressing of sides and bottom and backfilling in trenches with excavated suitable material. V. Marshy soil						
	Reclamation						
	protection wall along the Basin	1.000	400.000	4.000	3.000		4800.000
	Total						**4800.000**
						Total Quantity in cum	**4800.000**
2.002	12.11						
	Providing and laying filter media with granular crushed aggregates as per specification to a thickness of not less than 600 mm with smaller size towards the soil and bigger size towards the wall and providing over the entire surface behind abutment, wing wall, return wall to the full height, compacted to firm condition complete as per drawing and technical specification Clause 1204.3.8						
	for the filter media having 6mm and 20 mm broken stones						
	along basin	1.000	400.000	0.150	6.000		360.000
	Total						**360.000**
						Total Quantity in cum	**360.000**

PRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in kasaragod District -Construction of Wharf and Auction Hall-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Auction hall and wharf**			
1.001	12.22			
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.			
	Net Total	49.000MT	@120610.74/MT	5909926.26
1.002	12.23.3			
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm			
	Net Total	1969.200metre	@6921.99/metre	13630782.71
1.003	OD216/2022-2023			
	Providing and fixing reinforcement using High Corrosion Resistant (HCR) for the RCC works for superstructure including conveying, straightening, cutting, bending and tying in position etc. complete as per drawings, detailed specifications and directions of the Engineer-in-charge.			
	Net Total	184.211MT	@97850.12/MT	18025068.46
1.004	14.1.C.1			
	Furnishing and Placing Reinforced Cement Concrete Grade M30 Using Concrete Mixer in super-structure as per drawing and Technical Specification			
	Net Total	720.000cum	@8928.54/cum	6428548.80
			Heading Total(Rs)	43994326.23
2	**Auction hall- beams and slabs**			
2.001	10.22			
	Welding by gas or electric plant including transportation of plant at site etc. complete.			
	Net Total	80500.000cm	@3.90/cm	313950.00
2.002	OD220/2022-2023			
	Extra for addition of synthetic polyester triangular fibre of length 12 mm, effective diameter 10-40 microns and specific gravity of 1.34 to 1.40 in cement concrete/RCC/ Flooring / water retaining structures by using 125 gms of synthetic polyester triangular fibre for 50 kgs cement used as per directions of Engineer -in- Charge based on 4.18			
	Net Total	300.000kg	@564.07/kg	169221.00

Sl No	Specification	Quantity	Rate	Amount
2.003	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	1050.000sqm	@800.47/sqm	840493.50
2.004	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	540.000sqm	@637.63/sqm	344320.20
2.005	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	290.000sqm	@847.44/sqm	245757.60
2.006	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	1955.000sqm	@262.57/sqm	513324.35
2.007	13.7.1			
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	1005.000sqm	@393.71/sqm	395678.55
2.008	OD1854/2022-2023			
	Providing and fixing Ist quality ceramic glazed wall tiles conforming to IS: 15622(thickness to be specified by the manufacturer), of approved make, in all colours,shades except burgundy, bottle green, black of any size as approved by Engineerin-Charge,in skirting, risers of steps and dados, over 12 mm thick bed of cementmortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @3.3kg per sqm, including pointing in white cement mixed with pigment of matchingshade complete. (Based on 8.31 DAR)			
	Net Total	120.000sqm	@1190.03/sqm	142803.60
2.009	OD215/2022-2023			
	Providing and laying industrial floor tiles (12 mm thickness textured) of 1st quality conforming to IS :4457 of approved make ,in clours such as white ,ivory ,grey, fume red brown ,laid on 20 mm thick cement mortar 1:4 (1 cement:4 coarse sand), including pointing the joints with white cement and matching pigment etc .' complete Details of cost for 1 sqm MATERIAL Industrial floor tiles 300x300 mm size = 1 sqm Add for wastage & breakage @ 2.5% = 0.025 sqm Total = 1.025 sqm			
	Net Total	900.000sqm	@1903.73/sqm	1713357.00
2.010	OD221/2022-2023			
	wearing coat on deck slab using cement concrete 1:1.5:3 using 15mm broken stone for a thickness of 50mm including finishing with abrasion resistant hard top or equivalent chemical confirming to IS 1237 C-1980 &4kg/m2 of flooring including floated hard and trowelled smooth in 2 layers inclusive of all labour charges etc and including provision for making necessary grooves			

Sl No	Specification	Quantity	Rate	Amount
	for various joints but excluding cost of joint fillior and labour charges for filling."			
	Net Total	1300.000sqm	@652.60/sqm	848380.00
2.011	13.43.1			
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer			
	Net Total	1765.000sqm	@69.33/sqm	122367.45
2.012	13.46.1			
	Finishing walls with Acrylic Smooth exterior paint of required shade:New work (Two or more coat applied @ 1.67 ltr/10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/10 sqm)			
	Net Total	1004.400sqm	@190.25/sqm	191087.10
2.013	13.44.1			
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)			
	Net Total	1852.000sqm	@105.36/sqm	195126.72
	Heading Total(Rs)			6035867.07
	Total Estimation PAC			50030193.30
4	**Extra Charges**			
3.001	Provision for GST			
	50030193.30		18.00%	9005434.79
	Grand Total			59035628.09
	Round off			64371.91
	Rounded Total(Rs)			59100000.00
	Rupees Five Crore Ninety One Lakh			

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in kasaragod District -Construction of Wharf and Auction Hall-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Auction hall and wharf						
1.001	12.22						
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.						
	Auction hall						
	MS liner for wharf	2*24	6.000	3.14*.75		0.047100	31.945
	auction hall	2*12	6.000	3.14*.75		0.047100	15.973
	Rounding	1.000	1.082				1.082
	Total						**49.000**
						Total Quantity in MT	**49.000**
1.002	12.23.3						
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm						
	Auction hall						
	auction hall (upto +1.6m CD level)	2*12			25.75+1.6		656.400
	Total						**656.400**
	wharf						
	wharf (upto +1.6m CD level)	2*24			25.75+1.6		1312.800
	Total						**1312.800**
						Total Quantity in metre	**1969.200**
1.003	OD216/2022-2023						
	Providing and fixing reinforcement using High Corrosion Resistant (HCR) for the RCC works for superstructure including conveying, straightening, cutting, bending and tying in position etc. complete as per drawings, detailed specifications and directions of the Engineer-in-charge.						
	Auction hall & wharf piles						
	25 mm Dia rft	2*36*8	27.350			0.003850	60.651
	lap 25mm	2*36*8*2	1.000			0.003850	4.435

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	10 mm stirrups at 20cm c/c	2*36*125	3.140	0.650		0.000620	11.389
	stiffner 12mm	2*36*6	3.140	0.650		0.000890	0.785
	Total						**77.260**
	Auction hall-beam and slab						
	main beam for auction hall LS Wt taken @ 120Kg/m3	2.000	60.000	0.300	0.550	0.120000	2.376
	main beam for Wharf @ 120Kg/m3	2.000	120.000	0.300	0.550	0.120000	4.752
	Cross Beam @ 120Kg/m3	12.000	13.000	0.300	0.550	0.120000	3.089
	end beam for auction hall @ 120Kg/m3	24.000	6.600	0.300	0.550	0.120000	3.136
	Deck slab for auction hall @ 120Kg/m3	1.000	60.000	20.000	0.200	0.120000	28.800
	wharf @ 120Kg/m3	1.000	60.000	6.500	0.200	0.120000	9.360
	-do-	1.000	60.000	6.600	0.200	0.120000	9.504
	Facia wall @ 120Kg/m3	1.000	120.000	0.200	1.500	0.120000	4.320
	rounding	1.000	1.614				1.614
	Total						**66.951**
	Auction Hall						
	Column @ 150 kg/m3	2*12	0.400	0.400	4.500	0.150000	2.592
	Column @ 150 kg/m3	1*12	0.400	0.400	6.000	0.150000	1.728
	Beams @ 150 kg/m3	3.000	60.000	0.300	0.550	0.150000	4.455
	Beams @ 150 kg/m3	12*2	6.150	0.350	0.550	0.150000	4.262
	Beams @ 150 kg/m3	2.000	62.000	8.100	0.175	0.150000	26.366
	Rounding	1.000	0.597				0.597
	Total						**40.000**
						Total Quantity in MT	**184.211**
1.004	14.1.C.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Furnishing and Placing Reinforced Cement Concrete Grade M30 Using Concrete Mixer in super-structure as per drawing and Technical Specification						
	Auction hall-beam and slab						
	main beam for auction hall LS Wt taken as 120	12*2	6.000	0.300	0.550		23.760
	Cross Beam	12*4	5.200	0.300	0.550		41.184
	end beam for auction hall	12.000	5.000	0.300	0.550		9.900
	Deck slab for auction hall	1.000	60.000	15.000	0.175		157.500
	wharf beam	12*2	5.000	0.300	0.550		19.800
		12*2	5.200	0.300	0.550		20.592
	wharf	1.000	60.000	5.000	0.175		52.500
	wharf	1.000	60.000	6.600	0.175		69.300
	Facia wall	1.000	120.000	0.200	1.500		36.000
	Column	2*20	0.400	0.400	4.500		28.800
	Column	20.000	0.400	0.400	6.000		19.200
	Beam	3.000	60.000	0.300	0.550		29.700
	Beam	12*2	6.150	0.350	0.550		28.413
	Slab	2.000	62.000	8.100	0.175		175.770
	Slab	1.000	7.581				7.581
	Total						**720.000**
						Total Quantity in cum	**720.000**
2	Auction hall- beams and slabs						
2.001	10.22						
	Welding by gas or electric plant including transportation of plant at site etc. complete.						
	piles						
	lap 25mm	72*8*2*4					4608.000
	10 mm stirrups at 20cm c/c	72*125*8					72000.000
	stiffner 12mm c/c	72*6*8					3456.000
	Rounding	436.000					436.000
	Total						**80500.000**
						Total Quantity in cm	**80500.000**
2.002	OD220/2022-2023						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Extra for addition of synthetic polyester triangular fibre of length 12 mm, effective diameter 10-40 microns and specific gravity of 1.34 to 1.40 in cement concrete/RCC/ Flooring / water retaining structures by using 125 gms of synthetic polyester triangular fibre for 50 kgs cement used as per directions of Engineer -in- Charge based on 4.18						
	Synthetic Fibre - slab						
	Deck slab for auction hall (406.67x0.125/50 = 1.017)	1.000	60.000	15.000	0.175	1.017000	160.178
	wharf (406.67x0.125/50 = 1.017)	1.000	60.000	5.000	0.175	1.017000	53.393
	wharf (406.67x0.125/50 = 1.017)	1.000	60.000	6.600	0.175	1.017000	70.478
	Rounding	1.000	15.951				15.951
	Total						**300.000**
						Total Quantity in kg	**300.000**
2.003	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	slab						
	slab	2.000	62.000	8.100			1004.400
	rounding	1.000	24.900				24.900
	Total						**1029.300**
	beam						
		-2.000	60.000	0.300			-36.000
		12.000	13.500	0.350			56.700
	Total						**20.700**
						Total Quantity in sqm	**1050.000**
2.004	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	beam						
		3.000	60.000	1.400			252.000
		12*2	8.100	1.450			281.880
	rounding	1.000	6.120				6.120
	Total						**540.000**
						Total Quantity in sqm	**540.000**
2.005	5.9.6						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	Auction hall column						
	columns	2*12	1.600		4.500		172.800
		12.000	1.600		6.000		115.200
	rounding	1.000	2.000				2.000
	Total						**290.000**
						Total Quantity in sqm	**290.000**
2.006	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	Auction hall						
	column	2*20	1.600		4.500		288.000
	column	20.000	1.600		6.000		192.000
	beam	3.000	60.000	1.400			252.000
	beam	12*2	6.150	1.450			214.020
	slab	2.000	62.000	8.100			1004.400
	rounding	1.000	4.580				4.580
	Total						**1955.000**
						Total Quantity in sqm	**1955.000**
2.007	13.7.1						
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)						
	slab						
		2.000	62.000	8.100			1004.400
	rounding	1.000	0.600				0.600
	Total						**1005.000**
						Total Quantity in sqm	**1005.000**
2.008	OD1854/2022-2023						
	Providing and fixing Ist quality ceramic glazed wall tiles conforming to IS: 15622(thickness to be specified by the manufacturer), of approved make, in all colours,shades except burgundy, bottle green, black of any size as approved by Engineerin-Charge,in skirting, risers of steps and dados, over 12 mm thick bed of cementmortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @3.3kg per sqm, including pointing in white cement mixed with pigment of matchingshade complete. (Based on 8.31 DAR)						
	For Column						
	Column	3*12	1.600	2.000		1.000000	115.200
	rounding	1.000	4.800				4.800
	Total						**120.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in sqm	**120.000**
2.009	OD215/2022-2023						
	Providing and laying industrial floor tiles (12 mm thickness textured) of 1st quality conforming to IS :4457 of approved make ,in clours such as white ,ivory ,grey, fume red brown ,laid on 20 mm thick cement mortar 1:4 (1 cement:4 coarse sand), including pointing the joints with white cement and matching pigment etc .' complete Details of cost for 1 sqm MATERIAL Industrial floor tiles 300x300 mm size = 1 sqm Add for wastage & breakage @ 2.5% = 0.025 sqm Total = 1.025 sqm						
	Auction hall						
		1.000	60.000	15.000			900.000
	Total						**900.000**
						Total Quantity in sqm	**900.000**
2.010	OD221/2022-2023						
	wearing coat on deck slab using cement concrete 1:1.5:3 using 15mm broken stone for a thickness of 50mm including finishing with abrasion resistant hard top or equivalent chemical confirming to IS 1237 C-1980 &4kg/m2 of flooring including floated hard and trowelled smooth in 2 layers inclusive of all labour charges etc and including provision for making necessary grooves for various joints but excluding cost of joint fillior and labour charges for filling."						
	wharf						
		60.000	15.000				900.000
		60.000	6.600				396.000
	rounding	1.000	4.000				4.000
	Total						**1300.000**
						Total Quantity in sqm	**1300.000**
2.011	13.43.1						
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	Auction hall						
	column	2*20	1.600		2.500		160.000
	column	20.000	1.600		4.000		128.000
	beam	3.000	60.000	1.400			252.000
	beam	12*2	6.150	1.450			214.020
	slab	2.000	62.000	8.100			1004.400
	rounding	1.000	6.580				6.580
	Total						**1765.000**
						Total Quantity in sqm	**1765.000**
2.012	13.46.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Finishing walls with Acrylic Smooth exterior paint of required shade:New work (Two or more coat applied @ 1.67 ltr/10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/10 sqm)						
	slab						
		2.000	62.000	8.100			1004.400
	Total						**1004.400**
						Total Quantity in sqm	**1004.400**
2.013	13.44.1						
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)						
	Auction hall						
	column	2*20	1.600		2.500		160.000
	column	20.000	1.600		4.000		128.000
	beam	3.000	60.000	1.400			252.000
	beam	12*2	6.150	1.450			214.020
	slab	2.000	62.000	8.100			1004.400
	rounding	1.000	5.920				5.920
	Total						**1764.340**
	deduction -beam						
		2.000	60.000	0.300			36.000
		12*2.000	6.150	0.350			51.660
	Total						**87.660**
						Total Quantity in sqm	**1852.000**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Construction of Canteen, Rest shed, Locker room and gear shed-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Locker Rooms, Shop Rooms, Canteen & Net mending shed**			
1.001	2.31			
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared			
	Net Total	1000.000sqm	@14.48/sqm	14480.00
1.002	2.33.1			
	Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth			
	Net Total	10.000each	@439.60/each	4396.00
1.003	2.8.1			
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil			
	Net Total	790.000cum	@291.42/cum	230221.80
1.004	OD1735/2022-2023			
	Coconut Pile - Supplying and stacking well matured straight coconut post for driving down through various strata bellow bed level including cost conveyance labor charges etc complete.			
	Net Total	1800.000metre	@136.76/metre	246168.00
1.005	OD149/2022-2023			
	OD 6380 / 2020-2021 : Coconut Pile - Driving down coconut pile to lines and levels through soft to medium clay soil strata including all hire charges and labour and all other appliances necessary for pile driving down after pointing the bottom end. Details for one post of 6m long 15 numbers per day 6X15 = 90m Details for 90m length			
	Net Total	1800.000metre	@213.34/metre	384012.00
1.006	OD1736/2022-2023			
	Bailing out water Using 5HP Pump- Bailing out water with 5HP engine and pump set including conveyance to site and erection, cost of fuel, lubrication oil and other			

Sl No	Specification	Quantity	Rate	Amount
	stores, pay of staff etc complete			
	Net Total	240.000hour	@372.81/hour	89474.40
1.007	60.7.2			
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.			
	Net Total	122.000cum	@2557.65/cum	312033.30
1.008	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	175.000cum	@6687.21/cum	1170261.75
1.009	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	73.000cum	@7069.78/cum	516093.94
1.010	50.2.25.1			
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge			
	Net Total	200.000cum	@515.98/cum	103196.00
1.011	5.1.2			
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size			
	Net Total	118.000cum	@8914.94/cum	1051962.92
1.012	5.2.2			
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)			
	Net Total	52.000cum	@10748.82/cum	558938.64
1.013	5.3			
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	271.000cum	@11277.61/cum	3056232.31
1.014	5.22.6			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - Mechanically Treated bars of grade Fe-500D or more			
	Net Total	53700.000kilogram	@96.46/kilogram	5179902.00
1.015	10.6.2			
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.20 mm M.S. laths with 1.20 mm thick top cover			
	Net Total	100.000sqm	@3238.32/sqm	323832.00
1.016	10.7			
	Providing and fixing ball bearing for rolling shutters.			
	Net Total	24.000no	@484.97/no	11639.28
1.017	50.6.1.5			
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x20cm or nearest available size confirming to IS 2185 Part I of 1979 for super structure up to floor two level thickness 20cm and above in: CM 1:6 (1 cement : 6 coarse sand) etc complete			
	Net Total	180.000cum	@6580.80/cum	1184544.00
1.018	50.6.2.1			
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x15 cm or nearest available size confirming to IS 2185 part I of 1979 for foundation and plinth with thickness 15cm in: CM 1:6 (1 cement :6 coarse sand) etc complete			
	Net Total	15.000cum	@6179.60/cum	92694.00
1.019	9.1.1			
	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately).Second class teak wood			
	Net Total	2.300cum	@150367.20/cum	345844.56
1.020	9.7.1			
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick:Second class teak wood			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	25.000sqm	@3398.47/sqm	84961.75
1.021	9.9.1.2			
	Providing and fixing glazed shutters for door, windows and clerestory windows using 4 mm thick float glass panes including ISI marked M.S. Pressed butt hinges bright finished of required size with necessary screws.30 mm thick			
	Net Total	53.000sqm	@4575.39/sqm	242495.67
1.022	9.48.2			
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc			
	Net Total	830.000kg	@211.94/kg	175910.20
1.023	9.53			
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	188.000each	@207.00/each	38916.00
1.024	13.1.1			
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	1290.000sqm	@308.22/sqm	397603.80
1.025	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	1945.000sqm	@262.57/sqm	510698.65
1.026	13.11			
	18 mm cement plaster in two coats under layer 12 mm thick cement plaster 1:5 (1 cement : 5 coarse sand) finished with a top layer 6 mm thick cement plaster 1:6 (1 cement : 6 fine sand).			
	Net Total	1255.000sqm	@461.20/sqm	578806.00
1.027	11.41.2			
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.			
	Net Total	590.000sqm	@1733.20/sqm	1022588.00
1.028	OD156/2022-2023			
	Providing and laying industrial floor tiles (12 mm thickness textured) of 1st quality conforming to IS :4457 of approved make ,in clours such as white ,ivory ,grey, fume red brown ,laid on 20 mm thick cement mortar 1:4 (1 cement:4 coarse sand), including pointing the joints with white cement and matching pigment etc .' complete Details of cost for 1 sqm MATERIAL Industrial floor tiles 300x300 mm size = 1 sqm Add for wastage & breakage @ 2.5% = 0.025			

Sl No	Specification	Quantity	Rate	Amount
	sqm Total = 1.025 sqm			
	Net Total	260.000sqm	@1903.73/sqm	494969.80
1.029	9.97.3			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm			
	Net Total	28.000no	@103.95/no	2910.60
1.030	50.9.15.1			
	Supplying and fixing 200 mm Aluminium aldrop			
	Net Total	14.000no	@171.51/no	2401.14
1.031	9.100.2			
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm			
	Net Total	14.000no	@61.02/no	854.28
1.032	50.9.15.4			
	Providing and fixing iron hooks and eyes: 150 mm			
	Net Total	52.000no	@16.42/no	853.84
1.033	50.9.15.5			
	Providing and fixing iron hooks and eyes: 100 mm			
	Net Total	156.000no	@14.10/no	2199.60
1.034	13.37.1			
	White washing with lime to give an even shade:New work (three or more coats)			
	Net Total	3808.418sqm	@32.96/sqm	125525.46
1.035	13.44.1			
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)			
	Net Total	3808.418sqm	@105.36/sqm	401254.92
1.036	13.62.1			
	Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade:Two or more coats on new work over an under coat of suitable shade with ordinary paint of approved brand and manufacture .			
	Net Total	370.000sqm	@204.63/sqm	75713.10
1.037	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	210.000sqm	@329.03/sqm	69096.30
1.038	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended			

Sl No	Specification	Quantity	Rate	Amount
	floors, roofs, landings, balconies and access platform			
	Net Total	1100.000sqm	@800.47/sqm	880517.00
1.039	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	1162.000sqm	@637.63/sqm	740926.06
1.040	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	365.000sqm	@847.44/sqm	309315.60
1.041	5.9.16.1			
	Centering and shuttering including strutting, etc. and removal of form for: Edges of slabs and breaks in floors and wallsUnder 20 cm wide			
	Net Total	225.000metre	@200.11/metre	45024.75
	Heading Total(Rs)			21079469.42
	Total Estimation PAC			21079469.42
3	**Extra Charges**			
2.001	Provision for GST			
	21079469.42		18.00%	3794304.50
	Grand Total			24873773.92
	Round off			26226.08
	Rounded Total(Rs)			24900000.00
	Rupees Two Crore Forty Nine Lakh			

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Construction of Canteen, Rest shed, Locker room and gear shed-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Locker Rooms, Shop Rooms, Canteen & Net mending shed						
1.001	2.31						
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared						
	for Net mending shed and locker rooms						
	Net mending shed and locker rooms	1.000	50.000	20.000			1000.000
	Total						**1000.000**
						Total Quantity in sqm	**1000.000**
1.002	2.33.1						
	Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth						
	Trees						
	Trees	10.000					10.000
	Total						**10.000**
						Total Quantity in each	**10.000**
1.003	2.8.1						
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil						
	for wall						
	long wall	3.000	44.000	1.800	1.950		463.320
	cross wall	14*2	3.200	1.800	1.950		314.496
	Rounding	1.000	12.183				12.183
	Rounding	1.000	0.001				0.001
	Total						**790.000**
						Total Quantity in cum	**790.000**
1.004	OD1735/2022-2023						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Coconut Pile - Supplying and stacking well matured straight coconut post for driving down through various strata bellow bed level including cost conveyance labor charges etc complete.						
	For Net mending shed and locker rooms						
	Foundation	450.000	4.000			1.000000	1800.000
	Total						**1800.000**
						Total Quantity in metre	**1800.000**
1.005	OD149/2022-2023						
	OD 6380 / 2020-2021 : Coconut Pile - Driving down coconut pile to lines and levels through soft to medium clay soil strata including all hire charges and labour and all other appliances necessary for pile driving down after pointing the bottom end. Details for one post of 6m long 15 numbers per day 6X15 = 90m Details for 90m length						
	for foundation						
	for foundation	450.000	4.000				1800.000
	Total						**1800.000**
						Total Quantity in metre	**1800.000**
1.006	OD1736/2022-2023						
	Bailing out water Using 5HP Pump- Bailing out water with 5HP engine and pump set including conveyance to site and erection, cost of fuel, lubrication oil and other stores, pay of staff etc complete						
	For Net mending shed and locker rooms						
	Foundation (Footing)	30.000	8.000			1.000000	240.000
	Total						**240.000**
						Total Quantity in hour	**240.000**
1.007	60.7.2						
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.						
	for wall						
	long wall	3.000	44.000	1.800	0.300		71.280
	cross wall	14*2	3.200	1.800	0.300		48.384
	rounding	1.000	2.336				2.336
	Total						**122.000**
						Total Quantity in cum	**122.000**
1.008	4.1.8						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	strip footing bottom						
	Long wall	3.000	44.000	1.800	0.150		35.640
	cross wall	14*2	3.200	1.800	0.150		24.192
	rounding	1.000					1.000
	Total						**60.832**
	RR masonry bottom						
	Long wall	3.000	44.000	0.750	0.150		14.850
	cross wall	14*2	4.250	0.750	0.150		13.388
	rounding	1.000	1.928				1.928
	Total						**30.166**
	flooring						
	net mending shed	1.000	23.200	10.000	0.100		23.200
	locker and shop rooms	1.000	3.100	3.500	0.100		1.085
	verandah	2.000	16.200	1.500	0.100		4.860
	step	2*2	45.000	0.300	1.000		54.000
	rounding	1.000	0.857	1.000	1.000		0.857
	Total						**84.002**
						Total Quantity in cum	**175.000**
1.009	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	RR masonry						
	Long wall	3.000	44.000	0.450	0.600		35.640
	cross wall	14*2	4.550	0.450	0.600		34.398
	rounding	1.000	2.962				2.962
	Total						**73.000**
						Total Quantity in cum	**73.000**
1.010	50.2.25.1						
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge						
	filling						
	net mending shed	1.000	23.000	10.000	0.500		115.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	locker and shop rooms	10.000	3.100	3.500	0.500		54.250
	veranda	2.000	16.200	1.500	0.500		24.300
	rounding	1.000	6.450				6.450
	Total						**200.000**
						Total Quantity in cum	**200.000**
1.011	5.1.2						
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size						
	strip footing						
	long wall	3.000	44.000	1.500	0.200		39.600
	long wall	3.000	44.000	0.300	0.250		9.900
	cross wall	14*2	3.500	1.500	0.200		29.400
	cross wall	14*2	3.500	0.300	0.250		7.350
	Total						**86.250**
	plinth beam						
	long wall	3.000	44.000	0.300	0.450		17.820
	cross wall	14*2	5.000	0.300	0.300		12.600
	rpounding	1.000	1.330				1.330
	Total						**31.750**
						Total Quantity in cum	**118.000**
1.012	5.2.2						
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)						
	column						
	GF	3*14	0.450	0.300	5.500		31.185
	FF	3*14	0.450	0.300	3.500		19.845
	rounding	1.000	0.970		1.000		0.970
	Total						**52.000**
						Total Quantity in cum	**52.000**
1.013	5.3						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).						
	GF lintel, sunshade						
	GF sunshade	1.000	112.000	0.900	0.080		8.064
	GF lintel all round	1.000	108.400	0.200	0.200		4.336
	locker and shop rooms front side	2.000	16.800	0.200	0.200		1.344
	do- cross wall	4.000	7.000	0.200	0.150		0.840
	do- long wall	4.000	16.800	0.200	0.150		2.016
	stair room	2.000	32.000	0.200	0.150		1.920
	Total						**18.520**
	GF roof slabs						
	GF	1.000	46.200	11.200	0.150		77.616
	Stair landing	2.000	5.500	1.500	0.150		2.475
		2.000	2.500	1.500	0.150		1.125
		2.000	3.100	1.500	0.150		1.395
	step	2*25	1.500	0.300	0.150		3.375
	Deduct stair room roof	-1.000	4.800	11.200	0.150		-8.064
	Total						**77.922**
	GF beams						
	GF 1	14.000	10.000	0.300	0.500		21.000
	GF 2	3.000	45.000	0.300	0.350		14.175
	Total						**35.175**
	FF lintel, sunshade						
	FF sunshade	1.000	112.000	0.900	0.080		8.064
	FF lintel all round	1.000	108.400	0.200	0.200		4.336
	lintel rooms front side	2.000	16.800	0.200	0.200		1.344
	do-cross wall	4.000	7.000	0.200	0.150		0.840
	do-long wall	1.000	16.800	0.200	0.150		0.504
	stair room	2.000	32.000	0.200	0.150		1.920
	Total						**17.008**
	FF roof slabs						
	FF	1.000	46.200	11.200	0.150		77.616

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	stair landing	2.000	5.500	1.500	0.150		2.475
		2.000	2.500	1.500	0.150		1.125
		2.000	3.100	1.500	0.150		1.395
	step	2*25	1.500	0.300	0.150		3.375
	Total						**85.986**
	FF beams						
	FF 1	14.000	10.000	0.300	0.500		21.000
	FF 2	3.000	45.000	0.300	0.350		14.175
	rounding	1.000	1.214				1.214
	Total						**36.389**
						Total Quantity in cum	**271.000**
1.014	5.22.6						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - Mechanically Treated bars of grade Fe-500D or more						
	Strip footing						
	for strip footing	1.000	86.250			120.000000	10350.000
	Total						**10350.000**
	Plinth beam						
	for Plinth beam	1.000	31.750			150.000000	4762.500
	Total						**4762.500**
	Column						
	for column	1.000	52.000			150.000000	7800.000
	Total						**7800.000**
	GF lintel, sunshade						
	for GF lintel, sunshade	1.000	18.520			100.000000	1852.000
	Total						**1852.000**
	GF Roof slab						
	for GF Roof slab	1.000	77.922			100.000000	7792.200
	Total						**7792.200**
	GF beams						
	for GF beams	1.000	35.175			150.000000	5276.250
	Total						**5276.250**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	FF lintel, Sunshade						
	for FF lintel, Sunshade	1.000	17.008			100.000000	1700.800
	Total						**1700.800**
	FF roof slab						
	for FF roof slab	1.000	85.986			100.000000	8598.600
	Total						**8598.600**
	FF beams						
	for FF beams	1.000	36.389			150.000000	5458.350
	Total						**5458.350**
	Rounding						
		1.000	109.300				109.300
	Total						**109.300**
						Total Quantity in kilogram	**53700.000**
1.015	10.6.2						
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.20 mm M.S. laths with 1.20 mm thick top cover						
	RS						
	FF	10.000	3.100	2.400			74.400
	GF	2.000	4.800	2.400			23.040
	rounding	1.000	2.560				2.560
	Total						**100.000**
						Total Quantity in sqm	**100.000**
1.016	10.7						
	Providing and fixing ball bearing for rolling shutters.						
	GF						
	GF	12*2					24.000
	Total						**24.000**
						Total Quantity in no	**24.000**
1.017	50.6.1.5						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x20cm or nearest available size confirming to IS 2185 Part I of 1979 for super structure up to floor two level thickness 20cm and above in: CM 1:6 (1 cement : 6 coarse sand) etc complete						
	GF						
	net mending shed above lintel level	1.000	56.000	0.200	0.600		6.720
	locker and shop rooms	5.000	7.000	0.200	3.100		21.700
		3.000	15.000	0.200	3.250		29.250
	verandah	2.000	15.000	0.200	0.600		3.600
	stair room	1.000	34.000	0.200	9.000		61.200
	Total						**122.470**
	Deduction GF						
	RS	-10.000	3.100	0.200	2.400		-14.880
		-2.000	4.800	0.200	2.400		-4.608
	Total						**-19.488**
	FF						
	canteen	1.000	56.000	0.200	3.100		34.720
	verandah above lintel level	2.000	15.000	0.200	0.900		5.400
	rooms	5.000	7.000	0.200	3.100		21.700
		3.000	15.000	0.200	3.250		29.250
	Total						**91.070**
	Deduction FF						
	D 90X120	-14.000	0.900	0.200	1.200		-3.024
	W3 150X150	-26.000	1.500	0.200	1.500		-11.700
	Total						**-14.724**
	rounding						
		1.000	0.672				0.672
	Total						**0.672**
						Total Quantity in cum	**180.000**
1.018	50.6.2.1						
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x15 cm or nearest available size confirming to IS 2185 part I of 1979 for foundation and plinth with thickness 15cm in: CM 1:6 (1 cement :6 coarse sand) etc complete						
	parapet						
	parapet	1.000	115.000	0.150	0.700		12.075

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	2.925				2.925
	Total						**15.000**
						Total Quantity in cum	**15.000**
1.019	9.1.1						
	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately).Second class teak wood						
	First floor						
	D 90x210	14.000	37.632/1000			1.000000	0.527
	W3 150x150	26.000	66.460/1000			1.000000	1.728
	Rounding	1.000	0.045			1.000000	0.045
	Total						**2.300**
						Total Quantity in cum	**2.300**
1.020	9.7.1						
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick:Second class teak wood						
	Door						
	D 90X120	14.000	1.591				22.274
	rounding	1.000	2.726				2.726
	Total						**25.000**
						Total Quantity in sqm	**25.000**
1.021	9.9.1.2						
	Providing and fixing glazed shutters for door, windows and clerestory windows using 4 mm thick float glass panes including ISI marked M.S. Pressed butt hinges bright finished of required size with necessary screws.30 mm thick						
	window						
	W3 150X150	26.000	1.940				50.440
	rounding	1.000	2.560				2.560
	Total						**53.000**
						Total Quantity in sqm	**53.000**
1.022	9.48.2						
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	window						
	W3 150X150	26.000	13.000	1.500	1.560		790.920
	add 5%	1.000	36.000				36.000
	rounding	1.000	3.080				3.080
	Total						**830.000**
						Total Quantity in kg	**830.000**
1.023	9.53						
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	hold fast						
	D 90X120	14.000	6.000				84.000
	W3 150X150	26.000	4.000				104.000
	Total						**188.000**
						Total Quantity in each	**188.000**
1.024	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	Inside wall						
	locker and shop rooms	10.000	13.200		3.100		409.200
	verandah	2*2	15.000		0.600		36.000
	net mending shed - above lintel level	1.000	56.000		0.600		33.600
	strair room	2.000	18.700		9.000		336.600
	canteen	1.000	66.000		3.100		204.600
	rooms	10.000	13.200		3.100		409.200
	Passage	1.000	13.500		3.000		40.500
	rounding	1.000	2.700				2.700
	Total						**1472.400**
	Deductions						
	D 90x210	-14.000	0.900		2.100		-26.460
	R S	-10.000	3.100		2.400		-74.400
		-2.000	4.800		2.400		-23.040
	window	-26.000	1.500		1.500		-58.500
	Total						**-182.400**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in sqm	**1290.000**
1.025	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	ceiling-ground floor						
	net mending shed	1.000	23.200	10.000			232.000
	stair room	2.000	9.400	4.800			90.240
	verandah- GF	2.000	16.200	1.450			46.980
	shop rooms and locker rooms	10.000	3.100	3.500			108.500
	sunshade	1.000	113.600	0.900			102.240
	rounding	1.000	5.519				5.519
	Total						**585.479**
	ceiling-first floor						
	canteen	1.000	23.200	10.000			232.000
	verandah	2.000	16.200	1.450			46.980
	rooms	10.000	3.100	3.500			108.500
	sunshade	1.000	113.600	0.900			102.240
	rounding	1.000	5.519				5.519
	Total						**495.239**
	column						
	Ground floor	3*14	1.500		3.100		195.300
	First floor	3*14	1.500		3.100		195.300
	rounding	1.000	10.000				10.000
	Total						**400.600**
	ground floor-beams						
	GF 1	14.000	10.000	1.000			140.000
	GF 2	3.000	45.000	0.600			81.000
	rounding	1.000	10.000				10.000
	Total						**231.000**
	FF beams						
	FF 1	14.000	10.000	1.000			140.000
	FF 2	3.000	45.000	0.600			81.000
	rounding	1.000	11.682				11.682
	Total						**232.682**
						Total Quantity in sqm	**1945.000**
1.026	13.11						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	18 mm cement plaster in two coats under layer 12 mm thick cement plaster 1:5 (1 cement : 5 coarse sand) finished with a top layer 6 mm thick cement plaster 1:6 (1 cement : 6 fine sand).						
	outer wall						
	ground floor	1.000	110.000		0.600		66.000
	ground floor	1.000	110.000		3.100		341.000
	rounding	1.000					1.000
	Total						**408.000**
	parappet,roof top						
	first floor	2.000	111.000		0.750		166.500
	roof slap top	1.000	45.400		10.400		472.160
	sunshade top	2.000	113.600		0.900		204.480
	rounding	1.000	3.860				3.860
	Total						**847.000**
						Total Quantity in sqm	**1255.000**
1.027	11.41.2						
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.						
	Flooring						
	shop room and locker room	10.000	3.500	3.100			108.500
	verandah - GF	2.000	16.200	1.500			48.600
	Step	2*25	1.500	0.300			22.500
		2*25	1.500	0.150			11.250
	Landing	2*3	1.500	1.500			13.500
	Canteen	1.000	23.200	9.600			222.720
	rooms	10.000	3.500	3.100			108.500
	verandah	2.000	16.200	1.500			48.600
	rounding	1.000	5.830				5.830
	Total						**590.000**
						Total Quantity in sqm	**590.000**
1.028	OD156/2022-2023						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and laying industrial floor tiles (12 mm thickness textured) of 1st quality conforming to IS :4457 of approved make ,in clours such as white ,ivory ,grey, fume red brown ,laid on 20 mm thick cement mortar 1:4 (1 cement:4 coarse sand), including pointing the joints with white cement and matching pigment etc .' complete Details of cost for 1 sqm MATERIAL Industrial floor tiles 300x300 mm size = 1 sqm Add for wastage & breakage @ 2.5% = 0.025 sqm Total = 1.025 sqm						
	flooring						
	net mending shed	1.000	23.200	10.000		1.000000	232.000
	rounding	1.000	28.000			1.000000	28.000
	Total						**260.000**
						Total Quantity in sqm	**260.000**
1.029	9.97.3						
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm						
	150mm						
	Doors	14.000	2.000				28.000
	Total						**28.000**
						Total Quantity in no	**28.000**
1.030	50.9.15.1						
	Supplying and fixing 200 mm Aluminium aldrop						
	doors						
	Doors	14.000	1.000				14.000
	Total						**14.000**
						Total Quantity in no	**14.000**
1.031	9.100.2						
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm						
	doors						
	Doors	14.000	1.000				14.000
	Total						**14.000**
						Total Quantity in no	**14.000**
1.032	50.9.15.4						
	Providing and fixing iron hooks and eyes: 150 mm						
	Windows						
		26.000	2.000				52.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**52.000**
						Total Quantity in no	**52.000**
1.033	50.9.15.5						
	Providing and fixing iron hooks and eyes: 100 mm						
	windows						
		26.000	3.000	2.000			156.000
	Total						**156.000**
						Total Quantity in no	**156.000**
1.034	13.37.1						
	White washing with lime to give an even shade:New work (three or more coats)						
	inside wall						
	locker and shop rooms	10.000	13.200		3.100		409.200
	verandah	2*2	15.000		0.600		36.000
	net mending shed - above lintel level	1.000	56.000		0.600		33.600
	strair room	2.000	18.700		9.000		336.600
	canteen	1.000	66.000		3.100		204.600
	rooms	10.000	13.200		3.100		409.200
	Passage	1.000	13.500		3.000		40.500
	rounding	1.000					1.000
	Total						**1470.700**
	Deductions						
	D 90x210	-14.000	0.900		2.100		-26.460
	R S	-10.000	3.100		2.400		-74.400
		-2.000	4.800		2.400		-23.040
	window	-26.000	1.500		1.500		-58.500
	Total						**-182.400**
	ceiling-ground floor						
	net mending shed	1.000	23.200	10.000			232.000
	stair room	2.000	9.400	4.800			90.240
	verandah- GF	2.000	16.200	1.450			46.980
	shop rooms and locker rooms	10.000	3.100	3.500			108.500
	sunshade	1.000	113.600	0.900			102.240

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	5.519				5.519
	Total						**585.479**
	ceiling-first floor						
	canteen	1.000	23.200	10.000			232.000
	verandah	2.000	16.200	1.450			46.980
	rooms	10.000	3.100	3.500			108.500
	sunshade	1.000	113.600	0.900			102.240
	rounding	1.000	5.519				5.519
	Total						**495.239**
	column						
	Ground floor	3*14	1.500		3.100		195.300
	First floor	3*14	1.500		3.100		195.300
	rounding	1.000	10.000				10.000
	Total						**400.600**
	ground floor-beams						
	GF 1	14.000	10.000	1.000			140.000
	GF 2	3.000	45.000	0.600			81.000
	rounding	1.000	10.000				10.000
	Total						**231.000**
	First floor-beams						
	FF 1	14.000	10.000	1.000			140.000
	FF 2	3.000	45.000	0.600			81.000
	rounding	1.000	10.000				10.000
	Total						**231.000**
	outer wall						
	ground floor	1.000	110.000		0.600		66.000
	first floo	1.000	110.000		3.100		341.000
	rounding	1.000					1.000
	Total						**408.000**
	parappet						
	first floor	2.000	111.000		0.750		166.500
	first floor	1.000	2.300				2.300
	Total						**168.800**
						Total Quantity in sqm	**3808.418**
1.035	13.44.1						
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	painting						
	locker and shop rooms	10.000	13.200		3.100	1.000000	409.200
	verandah	2*2	15.000		0.600	1.000000	36.000
	net mending shed - above lintel level	1.000	56.000		0.600	1.000000	33.600
	strair room	2.000	18.700		9.000	1.000000	336.600
	canteen	1.000	66.000		3.100	1.000000	204.600
	rooms	10.000	13.200		3.100	1.000000	409.200
	Passage	1.000	13.500		3.000	1.000000	40.500
	rounding	1.000				1.000000	1.000
	D 90x210	-14.000	0.900		2.100	1.000000	-26.460
	R S	-10.000	3.100		2.400	1.000000	-74.400
		-2.000	4.800		2.400	1.000000	-23.040
	window	-26.000	1.500		1.500	1.000000	-58.500
	(Ceiling GF) net mending shed	1.000	23.200	10.000		1.000000	232.000
	stair room	2.000	9.400	4.800		1.000000	90.240
	verandah- GF	2.000	16.200	1.450		1.000000	46.980
	shop rooms and locker rooms	10.000	3.100	3.500		1.000000	108.500
	sunshade	1.000	113.600	0.900		1.000000	102.240
	rounding	1.000	5.519			1.000000	5.519
	(Ceiling FF)canteen	1.000	23.200	10.000		1.000000	232.000
	verandah	2.000	16.200	1.450		1.000000	46.980
	rooms	10.000	3.100	3.500		1.000000	108.500

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	sunshade	1.000	113.600	0.900		1.000000	102.240
	rounding	1.000	5.519			1.000000	5.519
	(GF beams) GF 1	14.000	10.000	1.000		1.000000	140.000
	GF 2	3.000	45.000	0.600		1.000000	81.000
	rounding	1.000	10.000			1.000000	10.000
	(FF Beams) FF 1	14.000	10.000	1.000		1.000000	140.000
	FF 2	3.000	45.000	0.600		1.000000	81.000
	rounding	1.000	10.000			1.000000	10.000
	(Outer wall) ground floor	1.000	110.000		0.600	1.000000	66.000
	first floor	1.000	110.000		3.100	1.000000	341.000
	rounding	1.000				1.000000	1.000
	(Parapet) first floor	2.000	111.000		0.750	1.000000	166.500
	first floor	1.000	2.300			1.000000	2.300
	Total						**3407.818**
	For Column						
	Ground floor	3*14	1.500		3.100	1.000000	195.300
	First floor	3*14	1.500		3.100	1.000000	195.300
	Rounding	1.000	10.000			1.000000	10.000
	Total						**400.600**
						Total Quantity in sqm	**3808.418**
1.036	13.62.1						
	Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade:Two or more coats on new work over an under coat of suitable shade with ordinary paint of approved brand and manufacture .						
	new wood work						
	Door D	14.000	0.900	2.210	2.250		62.654
	Window	26.000	1.500	1.500	1.000		58.500

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**121.154**
	iron work						
	Iron bars window W3	26.000	3.000	0.440	1.360		46.675
	collapsible steel shutters	10.000	3.100	2.400	2.000		148.800
		2.000	4.800	2.400	2.000		46.080
	rounding	1.000	7.291	1.000	1.000		7.291
	Total						**248.846**
						Total Quantity in sqm	**370.000**
1.037	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	Strip footing						
	Long wall	3*2	44.000		0.200		52.800
		3*2	44.000		0.250		66.000
	cross wall	14*2*2	3.500		0.200		39.200
		14*2*2	3.500		0.250		49.000
	rounding	3.000	1.000				3.000
	Total						**210.000**
						Total Quantity in sqm	**210.000**
1.038	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Ground floor -roof slab						
	GF	1.000	46.200	11.200			517.440
	Stair -landing	2.000	5.500	1.500			16.500
		2.000	2.500	1.500			7.500
		2.000	3.100	1.500			9.300
	Step	2*25.000	1.500	0.300			22.500
	Deduct stair room roof	-1.000	4.800	11.200			-53.760
	Total						**519.480**
	FF roof slab						
	FF	1.000	46.200	11.200			517.440
	Stair -landing	2.000	5.500	1.500			16.500

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		2.000	2.500	1.500			7.500
		2.000	3.100	1.500			9.300
	Step	2*25.000	1.500	0.300			22.500
	rounding	1.000	7.280				7.280
	Total						**580.520**
						Total Quantity in sqm	**1100.000**
1.039	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	GF and FF lintels,sunshades, beams						
	GF lintels, sunshades-GF sunshade	1.000	112.000	0.900			100.800
	GF lintel all round	1.000	108.400	0.600			65.040
	locker and shop rooms front side	2.000	16.800	0.600			20.160
	do- cross wall	4.000	7.000	0.500			14.000
	do- long wall	4.000	16.800	0.500			33.600
	stair room	2.000	32.000	0.500			32.000
	Beams-GF 1	14.000	10.000	1.000			140.000
	GF 2	3.000	45.000	0.600			81.000
	FF lintels, sunshade-FF sunshade	1.000	112.000	0.900			100.800
	FF lintel all round	1.000	108.400	0.600			65.040
	lintel rooms front side	2.000	16.800	0.600			20.160
	do-cross wall	4.000	7.000	0.600			16.800
	do-long wall	1.000	16.800	0.600			10.080
	stair room	2.000	32.000	0.600			38.400
	Beams-FF 1	14.000	10.000	1.000			140.000
	FF 2	3.000	45.000	0.600			81.000
	Total						**958.880**
	Plinth beam						
	long wall	3*2	44.000		0.450		118.800
	cross wall	14*2*2	5.000		0.300		84.000
	rounding	1.000	0.320				0.320

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**203.120**
						Total Quantity in sqm	**1162.000**
1.040	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	column						
	GF	3*14	1.500		3.100		195.300
	FF	3*14	1.300		3.100		169.260
	rounding	1.000	0.440		1.000		0.440
	Total						**365.000**
						Total Quantity in sqm	**365.000**
1.041	5.9.16.1						
	Centering and shuttering including strutting, etc. and removal of form for: Edges of slabs and breaks in floors and wallsUnder 20 cm wide						
	Roof edge						
	edge of slab	2.000	111.600				223.200
	rounding	1.000	1.800				1.800
	Total						**225.000**
						Total Quantity in metre	**225.000**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Compound wall and side Protection works-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Truck bay**			
1.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	920.000cum	@210.02/cum	193218.40
1.002	OD1738/2022-2023			
	Coconut Pile - Supplying and stacking well matured straight coconut post for driving down through various strata bellow bed level including cost conveyance labor charges etc complete.			
	Net Total	10570.000metre	@136.76/metre	1445553.20
1.003	OD206/2022-2023			
	OD 6380 / 2020-2021 : Coconut Pile - Driving down coconut pile to lines and levels through soft to medium clay soil strata including all hire charges and labour and all other appliances necessary for pile driving down after pointing the bottom end. Details for one post of 6m long 15 numbers per day 6X15 = 90m Details for 90m length			
	Net Total	9060.000metre	@213.34/metre	1932860.40
1.004	60.64.6			
	Cutting and removing the excess length of wooden piles to lines and levels and removing the cut end of piles and stacking within 150m			
	Net Total	3020.000each	@191.17/each	577333.40
1.005	60.7.6			
	Supplying and stacking granite stone 20 to 45 dm3 for dumping works- Supplying at site of work granite stone 20 to 45 dm3 in size (60% 45m3,30%30 to 40dm3 and 10% 20 to 30dm3 stones) for measurement (deducting not less than 15% for voids as fixed by the departmental officer at site) including all cost, conveyance, loading and unloading charges all other incidental charges all leads and lifts etc. complete as per the direction of the departmental officers at site.			
	Net Total	3040.000cum	@1994.90/cum	6064496.00
1.006	60.7.7			
	Conveyance and dumping of departmental granite stones-Conveyance of departmental granite stone 20 to 45 dm3 in size from stack at site and dumping in			

Sl No	Specification	Quantity	Rate	Amount
	position (60% 45m3,30%30 to 40dm3 and 10% 20 to 30dm3 stones) to lines and levels to from the core of the sea wall as per approved design including all leads and lifts etc. complete as per the direction of the departmental officers at site.			
	Net Total	3040.000cum	@605.23/cum	1839899.20
1.007	4.1.5			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	81.600cum	@7229.54/cum	589930.46
1.008	16.96			
	Providing & making Gabion structure with Mechanically Woven Double Twisted Hexagonal Shaped Wire mesh Gabion Boxes as per IS 16014:2012,MORTH Clause 2500, of required size, Mesh Type 10x12(D=100 mm with tolerance of ±2%), Zinic+10%Al alloy+PVC coated, Mesh wire diameter 2.7/3.7mm (ID/OD),mechanically edged/selvedged with partitions at every 1m interval and shall have minimum 10 numbersof openings per meter of mesh perpendicular to twist, tying with lacing wire of diameter2.2/3.2mm(ID/OD), supplied @3% by weight of Gabion boxes, filled with boulders with least dimension of 200 mm, as per drawing, all complete as per directions of Engineer-in-charge			
	Net Total	5130.000cum	@4735.18/cum	24291473.40
1.009	OD287/2022-2023			
	Laying of geotextile filter between pitching and embankment slopes on which pitching is laid to prevent escape of the embankment material through the voids of the stone pitching / cement concrete block as well as to allow free movements of water with out creating any uplift head on the pitching (OD approved by SE NC Order no D4 /179/2016/SE dt 23.2.2017 item no E4)and in price ID no 2017/928 			
	Net Total	4530.000sqm	@113.81/sqm	515559.30
1.010	4.1.6			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)			
	Net Total	81.600cum	@7076.05/cum	577405.68
1.011	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	305.072cum	@10858.36/cum	3312581.60
1.012	5.34.1			

Sl No	Specification	Quantity	Rate	Amount
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	305.072cum	@80.55/cum	24573.55
1.013	4.3.1			
	Centering and shuttering including strutting, propping etc. and removal of form work for:Foundations, footings, bases for columns			
	Net Total	834.270sqm	@329.03/sqm	274499.86
1.014	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	592.651cum	@7069.78/cum	4189912.19
1.015	OD288/2022-2023			
	Laterate masonry with neatly dressed laterate stone of size 30x20x20cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc. 			
	Net Total	321.235cum	@7872.96/cum	2529070.31
1.016	OD5538/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - HCR			
	Net Total	17332.880kilogram	@96.62/kilogram	1674702.87
1.017	13.1.2			
	12 mm cement plaster of mix:1:6 (1 cement : 6 fine sand).			
	Net Total	4093.500sqm	@293.67/sqm	1202138.15
1.018	13.43.1			
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer			
	Net Total	4093.500sqm	@69.33/sqm	283802.36
1.019	13.44.1			
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)			
	Net Total	4093.500sqm	@105.36/sqm	431291.16
	Heading Total(Rs)			51950301.49
	Total Estimation PAC			51950301.49
3	**Extra Charges**			

Sl No	Specification	Quantity	Rate	Amount
2.001	Provision for GST			
		51950301.49	18.00%	9351054.27
			Grand Total	61301355.76
			Round off	98644.24
			Rounded Total(Rs)	61400000.00
	Rupees Six Crore Fourteen Lakh			

ePRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Compound wall and side Protection works-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Truck bay						
1.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	Excavation						
	for compound wall near main break water to entrance gate	1.000	67.000	0.800	0.800		42.880
	from entrance gate to lee ward break water	1.000	440.000	0.800	0.800		281.600
	for side protection , East side of river training	1.000	485.000	2.400	0.300		349.200
	for side protection , west of river training	1.000	205.000	2.400	0.300		147.600
	for side protection , west of river training	1.000	120.000	2.400	0.300		86.400
	Rounding qty	1.000	12.320	1.000	1.000		12.320
	Total						**920.000**
						Total Quantity in cum	**920.000**
1.002	OD1738/2022-2023						
	Coconut Pile - Supplying and stacking well matured straight coconut post for driving down through various strata bellow bed level including cost conveyance labor charges etc complete.						
	For Gabion box at 1m interval						
	Side protection wall near east side of river training	2*485	3.500			1.000000	3395.000
	_do_ (west)	2*205	3.500			1.000000	1435.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	_do_ (west)	2*120	3.500			1.000000	840.000
	Basin boundary between main and leeward break water	2*600	3.500			1.000000	4200.000
	Basin boundary near leeward break water	2*100	3.500			1.000000	700.000
	Total						**10570.000**
						Total Quantity in metre	**10570.000**
1.003	OD206/2022-2023						
	OD 6380 / 2020-2021 : Coconut Pile - Driving down coconut pile to lines and levels through soft to medium clay soil strata including all hire charges and labour and all other appliances necessary for pile driving down after pointing the bottom end. Details for one post of 6m long 15 numbers per day 6X15 = 90m Details for 90m length						
	coconut pile						
	Side protection wall near east side of river training	2*485	3.000			1.000000	2910.000
	_do_ (west)	2*205	3.000			1.000000	1230.000
	_do_ (west)	2*120	3.000			1.000000	720.000
	Basin boundary between main and leeward break water	2*600	3.000			1.000000	3600.000
	Basin boundary near leeward break water	2*100	3.000			1.000000	600.000
	Total						**9060.000**
						Total Quantity in metre	**9060.000**
1.004	60.64.6						
	Cutting and removing the excess length of wooden piles to lines and levels and removing the cut end of piles and stacking within 150m						
	excess length cutting						
	Side protection wall near east side of river training	2*485				1.000000	970.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	_do_ (west)	2*205				1.000000	410.000
	_do_ (west)	2*120				1.000000	240.000
	Basin boundary between main and leeward break water	2*600				1.000000	1200.000
	Basin boundary near leeward break water	2*100				1.000000	200.000
	Total						**3020.000**
						Total Quantity in each	**3020.000**
1.005	60.7.6						
	Supplying and stacking granite stone 20 to 45 dm3 for dumping works- Supplying at site of work granite stone 20 to 45 dm3 in size (60% 45m3,30%30 to 40dm3 and 10% 20 to 30dm3 stones) for measurement (deducting not less than 15% for voids as fixed by the departmental officer at site) including all cost, conveyance, loading and unloading charges all other incidental charges all leads and lifts etc. complete as per the direction of the departmental officers at site.						
	side protection wall						
	for side protection , East side of river training	1.000	485.000	2.400	0.450		523.800
	for side protection , west of river training	1.000	205.000	2.400	0.450		221.400
	for side protection , west of river training	1.000	120.000	2.400	0.450		129.600
	Basin boundary between main and leeward break water	1.000	600.000	2.400	1.000	1.000000	1440.000
	Basin boundary near leeward break water	1.000	300.000	2.400	1.000	1.000000	720.000
	roundig	5.200					5.200
	Total						**3040.000**
						Total Quantity in cum	**3040.000**
1.006	60.7.7						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Conveyance and dumping of departmental granite stones-Conveyance of departmental granite stone 20 to 45 dm3 in size from stack at site and dumping in position (60% 45m3,30%30 to 40dm3 and 10% 20 to 30dm3 stones) to lines and levels to from the core of the sea wall as per approved design including all leads and lifts etc. complete as per the direction of the departmental officers at site.						
	for side protection wall						
	for side protection , East side of river training	1.000	485.000	2.400	0.450		523.800
	for side protection , west of river training	1.000	205.000	2.400	0.450		221.400
	for side protection , west of river training	1.000	120.000	2.400	0.450		129.600
	Basin boundary between main and leeward break water	1.000	600.000	2.400	1.000	1.000000	1440.000
	Basin boundary near leeward break water	1.000	300.000	2.400	1.000	1.000000	720.000
	rounding	1.000	5.200			1.000000	5.200
	Total						**3040.000**
						Total Quantity in cum	**3040.000**
1.007	4.1.5						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	foundation footing						
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.800	0.200		11.200
	from entrance gate to lee ward breakwater	1.000	440.000	0.800	0.200		70.400
	Total						**81.600**
						Total Quantity in cum	**81.600**
1.008	16.96						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing & making Gabion structure with Mechanically Woven Double Twisted Hexagonal Shaped Wire mesh Gabion Boxes as per IS 16014:2012,MORTH Clause 2500, of required size, Mesh Type 10x12(D=100 mm with tolerance of ±2%), Zinic+10%Al alloy+PVC coated, Mesh wire diameter 2.7/3.7mm (ID/OD),mechanically edged/selvedged with partitions at every 1m interval and shall have minimum 10 numbersof openings per meter of mesh perpendicular to twist, tying with lacing wire of diameter2.2/3.2mm(ID/OD), supplied @3% by weight of Gabion boxes, filled with boulders with least dimension of 200 mm, as per drawing, all complete as per directions of Engineer-in-charge						
	gabion box						
	Side protection wall near east side of river training	1.000	485.000	2.000	1.000	1.000000	970.000
		1.000	485.000	1.000	1.000	1.000000	485.000
	_do_ (west)	1.000	205.000	2.000	1.000	1.000000	410.000
		1.000	205.000	1.000	1.000	1.000000	205.000
	_do_ (west)	1.000	120.000	2.000	1.000	1.000000	240.000
		1.000	120.000	1.000	1.000	1.000000	120.000
	Basin boundary between main and leeward break water	1.000	600.000	2.000	1.000	1.000000	1200.000
		1.000	600.000	1.000	1.000	1.000000	600.000
	Basin boundary near leeward break water	1.000	300.000	2.000	1.000	1.000000	600.000
		1.000	300.000	1.000	1.000	1.000000	300.000
	Total						**5130.000**
						Total Quantity in cum	**5130.000**
1.009	OD287/2022-2023						
	Laying of geotextile filter between pitching and embankment slopes on which pitching is laid to prevent escape of the embankment material through the voids of the stone pitching / cement concrete block as well as to allow free movements of water with out creating any uplift head on the pitching (OD approved by SE NC Order no D4 /179/2016/SE dt 23.2.2017 item no E4)and in price ID no 2017/928 						
	geotextile						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Side protection wall near east side of river training	1.000	485.000		3.000	1.000000	1455.000
	_do_ (west)	1.000	205.000		3.000	1.000000	615.000
	_do_ (west)	1.000	120.000		3.000	1.000000	360.000
	Basin boundary between main and leeward break water	1.000	600.000		3.000	1.000000	1800.000
	Basin boundary near leeward break water	1.000	100.000		3.000	1.000000	300.000
	Total						**4530.000**
						Total Quantity in sqm	**4530.000**
1.010	4.1.6						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)						
	cement concrete						
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.800	0.200		11.200
	from entrance gate to lee ward breakwater	1.000	440.000	0.800	0.200		70.400
	Total						**81.600**
						Total Quantity in cum	**81.600**
1.011	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	coping						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.350	0.075		1.838
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.350	0.075/2		0.919
	from entrance gate to lee ward breakwater	1.000	440.000	0.350	0.075		11.550
	from entrance gate to lee ward breakwater	1.000	440.000	0.350	0.075/2		5.775
	sideprotectioneast of river training work	1.000	485.000	0.350	0.075	1.000000	12.731
	sideprotectioneast of river training work	1.000	485.000	0.350	0.075/2	1.000000	6.366
	Butress wall at 3.6 m intervals	276.000	0.550	0.550	0.075	1.000000	6.262
	Butress wall at 3.6 m intervals	276.000	0.550	0.550	0.075/2	1.000000	3.131
	Total						**48.572**
	belt over gabion box						
	sideprotectioneast of river training work	1.000	485.000	1.000	0.150	1.000000	72.750
	do west	1.000	205.000	1.000	0.150	1.000000	30.750
	do	1.000	120.000	1.000	0.150	1.000000	18.000
	basin boundary between main and leeward	1.000	600.000	1.000	0.150	1.000000	90.000
	near leeward breakwater	1.000	300.000	1.000	0.150	1.000000	45.000
	Total						**256.500**
						Total Quantity in cum	**305.072**
1.012	5.34.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	coping						
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.350	0.075		1.838
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.350	0.075/2		0.919
	from entrance gate to lee ward breakwater	1.000	440.000	0.350	0.075		11.550
	from entrance gate to lee ward breakwater	1.000	440.000	0.350	0.075/2		5.775
	sideprotectioneast of river training work	1.000	485.000	0.350	0.075	1.000000	12.731
	sideprotectioneast of river training work	1.000	485.000	0.350	0.075/2	1.000000	6.366
	Butress wall at 3.6 m intervals	276.000	0.550	0.550	0.075	1.000000	6.262
	Butress wall at 3.6 m intervals	276.000	0.550	0.550	0.075/2	1.000000	3.131
	Total						**48.572**
	belt over gabion box						
	sideprotectioneast of river training work	1.000	485.000	1.000	0.150	1.000000	72.750
	do west	1.000	205.000	1.000	0.150	1.000000	30.750
	do	1.000	120.000	1.000	0.150	1.000000	18.000
	basin boundary between main and leeward	1.000	600.000	1.000	0.150	1.000000	90.000
	near leeward breakwater	1.000	300.000	1.000	0.150	1.000000	45.000
	Total						**256.500**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**305.072**
1.013	4.3.1						
	Centering and shuttering including strutting, propping etc. and removal of form work for:Foundations, footings, bases for columns						
	shuttering work						
	sideprotectioneast of river training work	2.000	485.000		0.150	1.000000	145.500
	do west	2.000	205.000		0.150	1.000000	61.500
	do	2.000	120.000		0.150	1.000000	36.000
	basin boundary between main and leeward	2.000	600.000		0.150	1.000000	180.000
	near leeward breakwater	2.000	300.000		0.150	1.000000	90.000
	Total						**513.000**
	for coping						
	for compound wall over land ,from auction hall area to entrance gate	2.000	70.000		0.150		21.000
	from entrance gate to lee ward breakwater	2.000	440.000		0.150		132.000
	sideprotectioneast of river training work	2.000	485.000		0.150	1.000000	145.500
	Butress wall at 3.6 m intervals	276.000	0.550		0.150	1.000000	22.770
	Total						**321.270**
						Total Quantity in sqm	**834.270**
1.014	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	RR						
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.600	0.600		25.200

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.450	0.450		14.175
	from entrance gate to lee ward breakwater	1.000	440.000	0.600	0.600		158.400
	for compound wall over land ,from auction hall area to entrance gate	1.000	440.000	0.450	0.450		89.100
	side protection east of river training work	1.000	485.000	0.450	0.450	1.000000	98.213
	do west	1.000	205.000	0.450	0.450	1.000000	41.513
	do	1.000	120.000	0.450	0.450	1.000000	24.300
	basin boundary between main and leeward	1.000	600.000	0.450	0.450	1.000000	121.500
	near leeward breakwater	1.000	100.000	0.450	0.450	1.000000	20.250
	Total						**592.651**
						Total Quantity in cum	**592.651**
1.015	OD288/2022-2023						
	Laterate masonry with neatly dressed laterate stone of size 30x20x20cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc. 						
	laterite masonry						
		1.000					1.000
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.200	1.500		21.000
	from entrance gate to lee ward breakwater	1.000	440.000	0.200	1.500		132.000
	sideprotectioneast of river training work	1.000	485.000	0.200	1.500	1.000000	145.500
	Butress wall at 3.6 m intervals	276.000	0.350	0.150	1.500	1.000000	21.735

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**321.235**
						Total Quantity in cum	**321.235**
1.016	OD5538/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - HCR						
	Steel						
	LS Wt taken as 40kg/m3 for item no 11	1.000	48.572			40.000000	1942.880
	LS Wt taken as 60kg/m3 for item no 11 belt	1.000	256.500			60.000000	15390.000
	Total						**17332.880**
						Total Quantity in kilogram	**17332.880**
1.017	13.1.2						
	12 mm cement plaster of mix:1:6 (1 cement : 6 fine sand).						
	plastering						
	for compound wall over land ,from auction hall area to entrance gate	2.000	70.000		1.500		210.000
	from entrance gate to lee ward breakwater	2.000	440.000		1.500		1320.000
	sideprotectioneast of river training work	2.000	485.000		1.500	1.000000	1455.000
	Butress wall at 3.6 m intervals	276.000	0.500		1.500	1.000000	207.000
	Total						**3192.000**
	plastering over coping						
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.750			52.500
	from entrance gate to lee ward breakwater	1.000	440.000	0.750			330.000
	sideprotectioneast of river training work	1.000	485.000	0.750		1.000000	363.750

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Butress wall at 3.6 m intervals	276.000	0.750	0.750		1.000000	155.250
	Total						**901.500**
						Total Quantity in sqm	**4093.500**
1.018	13.43.1						
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	primer						
	for compound wall over land ,from auction hall area to entrance gate	2.000	70.000		1.500		210.000
	from entrance gate to lee ward breakwater	2.000	440.000		1.500		1320.000
	sideprotectioneast of river training work	2.000	485.000		1.500	1.000000	1455.000
	Butress wall at 3.6 m intervals	276.000	0.500		1.500	1.000000	207.000
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.750			52.500
	from entrance gate to lee ward breakwater	1.000	440.000	0.750			330.000
	sideprotectioneast of river training work	1.000	485.000	0.750		1.000000	363.750
	Butress wall at 3.6 m intervals	276.000	0.750	0.750		1.000000	155.250
	Total						**4093.500**
						Total Quantity in sqm	**4093.500**
1.019	13.44.1						
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)						
	painting						
	for compound wall over land ,from auction hall area to entrance gate	2.000	70.000		1.500		210.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	from entrance gate to lee ward breakwater	2.000	440.000		1.500		1320.000
	sideprotectioneast of river training work	2.000	485.000		1.500	1.000000	1455.000
	Butress wall at 3.6 m intervals	276.000	0.500		1.500	1.000000	207.000
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.750			52.500
	from entrance gate to lee ward breakwater	1.000	440.000	0.750			330.000
	sideprotectioneast of river training work	1.000	485.000	0.750		1.000000	363.750
	Butress wall at 3.6 m intervals	276.000	0.750	0.750		1.000000	155.250
	Total						**4093.500**
						Total Quantity in sqm	**4093.500**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasargod District- Construction of Gate and Gate House-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Gate and Gate house**			
1.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	50.000cum	@210.02/cum	10501.00
1.002	2.26.1			
	Extra for every additional lift 1.5 m or part there of in excavation / banking excavated or stacked materials.All kinds of soil			
	Net Total	2.250cum	@104.39/cum	234.88
1.003	2.16.1			
	Close timbering in trenches including strutting, shoring and packing cavities (wherever required) complete (Measurements to be taken of the face area timbered).Depth not exceeding 1.5m			
	Net Total	18.000sqm	@150.11/sqm	2701.98
1.004	OD1742/2022-2023			
	Bailing out water Using 5HP Pump- Bailing out water with 5HP engine and pump set including conveyance to site and erection, cost of fuel, lubrication oil and other stores, pay of staff etc complete			
	Net Total	50.000hour	@372.81/hour	18640.50
1.005	60.7.2			
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.			
	Net Total	10.000cum	@2557.65/cum	25576.50
1.006	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	20.000cum	@6687.21/cum	133744.20
1.007	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	15.000cum	@7069.78/cum	106046.70
1.008	OD308/2022-2023			
	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. All work upto plinth level 			
	Net Total	3.676cum	@9317.74/cum	34252.01
1.009	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	11.040sqm	@329.03/sqm	3632.49
1.010	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	35.040sqm	@847.44/sqm	29694.30
1.011	OD309/2022-2023			
	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. All work above plinth level upto floor V level 			
	Net Total	12.071cum	@10938.91/cum	132043.58
1.012	5.22.6			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - Mechanically Treated bars of grade Fe-500D or more			
	Net Total	313.520kilogram	@96.46/kilogram	30242.14
1.013	5.22A.6			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - Mechanically Treated bars of grade Fe-500D or more			
	Net Total	1509.740kg	@96.46/kg	145629.52
1.014	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	51.388sqm	@637.63/sqm	32766.53
1.015	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	36.476sqm	@800.47/sqm	29197.94
1.016	5.9.16.1			
	Centering and shuttering including strutting, etc. and removal of form for: Edges of slabs and breaks in floors and wallsUnder 20 cm wide			
	Net Total	63.600metre	@200.11/metre	12727.00
1.017	50.6.1.5			
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x20cm or nearest available size confirming to IS 2185 Part I of 1979 for super structure up to floor two level thickness 20cm and above in: CM 1:6 (1 cement : 6 coarse sand) etc complete			
	Net Total	10.488cum	@6580.80/cum	69019.43
1.018	9.48.2			
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc			
	Net Total	86.725kg	@211.94/kg	18380.50
1.019	9.117.2			
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 42x50 mm			
	Net Total	10.400metre	@308.89/metre	3212.46
1.020	9.118.1			
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	4.200sqm	@2033.68/sqm	8541.46
1.021	5.23			
	Smooth finishing of the exposed surface of RCC work with 6mm thick cement mortar 1:3 (cement : 3 fine sand).			
	Net Total	136.364sqm	@262.57/sqm	35805.10
1.022	13.1.1			
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	66.000sqm	@308.22/sqm	20342.52
1.023	11.41.2			
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.			
	Net Total	15.440sqm	@1733.20/sqm	26760.61
1.024	13.48.1			
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm			
	Net Total	85.676sqm	@164.22/sqm	14069.71
1.025	13.47.1			
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)			
	Net Total	137.736sqm	@186.15/sqm	25639.56
1.026	13.52.1			
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work			
	Net Total	30.880sqm	@219.17/sqm	6767.97
1.027	9.97.2			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:250x10 mm			
	Net Total	2.000no	@119.63/no	239.26
1.028	9.100.2			
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm			
	Net Total	2.000no	@61.02/no	122.04

Sl No	Specification	Quantity	Rate	Amount
1.029	12.47.1			
	Providing & fixing UV stabilised fibre glass reinforced plastic sheet rooting up to any pitch, including fixing with polymer coated 'J' or 'L' hooks, bolts & nuts 8 mm dia G.I plain/ bitumen washers complete but excluding the cost of purlins, rafters, trusses etc. The sheets shall be manufactured out of 2400 TEX panel rovings incorporating minimum 0.3% ultra-violet stabiliser in resin system under approxirnately 2400 psi and hot cured. They shall be of uniform pigmentation and thickness without air pockets and shall conform to IS 10192 and IS 12866. The sheets shall be opaque or translucent, clear or pigmented, textured or smooth as specified.2 mm thick corrugate 2.5"or 4.2" or 6") or step-down (2' or 3" or 6") as specified.			
	Net Total	15.428sqm	@1265.03/sqm	19516.88
1.030	10.25.2			
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works			
	Net Total	128.339kg	@151.29/kg	19416.41
1.031	21.1.1.3			
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionPolyester powder coated aluminium (minimum thickness of polyester powder coating 50 micron)			
	Net Total	69.972kg	@536.75/kg	37557.47
1.032	21.1.2.3			
	For shutters of doors, windows & ventilators including providing and fixing hinges / pivots and making provision for fixing of fittings wherever required including the cost of EPDM rubber/ neoprene gasket required (Fittings shall be paid for separately)Polyester powder coated aluminium (minimum thickness of polyester powder coating 50 micorn)			
	Net Total	83.116kg	@641.01/kg	53278.19
1.033	21.3.1			
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 4.0 mm thickness			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	7.110sqm	@1154.59/sqm	8209.13
1.034	8.2.2.2			
	Providing and fixing 18 mm thick gang saw cut, mirror, polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations, of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.Area of slab over 0.50 sqm			
	Net Total	71.625sqm	@4629.02/sqm	331553.56
			Heading Total(Rs)	1446063.53
			Total Estimation PAC	1446063.53
3	**Extra Charges**			
2.001	Provision for GST			
		1446063.53	18.00%	260291.44
			Grand Total	1706354.97
			Round off	93645.03
			Rounded Total(Rs)	1800000.00
	Rupees Eighteen Lakh			

e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasargod District- Construction of Gate and Gate House-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Gate and Gate house						
1.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	gate & gate house						
	For main pillars	2.000	1.500	1.500	2.000		9.000
	For side pillars	2.000	1.200	1.200	1.500		4.320
	For walls	2.000	10.400	0.900	1.100		20.592
	Steps	2.000	2.800	0.450	0.300		0.756
	Wicket gate	2.000	3.140	(.9*.9)/4	0.300		0.382
	Building floor (All round)	2.000	17.200	1.500	0.150		7.740
	Gate portion	1.000	4.000	5.800	0.150		3.480
	rounding	1.000	3.730				3.730
	Total						**50.000**
						Total Quantity in cum	**50.000**
1.002	2.26.1						
	Extra for every additional lift 1.5 m or part there of in excavation / banking excavated or stacked materials.All kinds of soil						
	gate house						
	For main pillars	2.000	1.500	1.500	0.500		2.250
	Total						**2.250**
						Total Quantity in cum	**2.250**
1.003	2.16.1						
	Close timbering in trenches including strutting, shoring and packing cavities (wherever required) complete (Measurements to be taken of the face area timbered).Depth not exceeding 1.5m						
	gate house						
	For main pillars	2.000	6.000		1.500		18.000
	Total						**18.000**
						Total Quantity in sqm	**18.000**
1.004	OD1742/2022-2023						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Bailing out water Using 5HP Pump- Bailing out water with 5HP engine and pump set including conveyance to site and erection, cost of fuel, lubrication oil and other stores, pay of staff etc complete						
	For Gate and Gate House						
	Pumping required for 10 hrs with 5 hp pump set	5.000	10.000			1.000000	50.000
	Total						**50.000**
						Total Quantity in hour	**50.000**
1.005	60.7.2						
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.						
	Gate and gate house						
	For main pillars	2.000	1.500	1.500	0.300		1.350
	For side pillars	2.000	1.200	1.200	0.300		0.864
	For walls	2.000	10.400	0.900	0.300		5.616
	Steps	2.000	2.800	0.450	0.200		0.504
	rounding	1.000	1.666				1.666
	Total						**10.000**
						Total Quantity in cum	**10.000**
1.006	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	pcc						
	For main pillars	2.000	1.500	1.500	0.150		0.675
	For side pillars	2.000	1.200	1.200	0.150		0.432
	For walls	2.000	10.400	0.900	0.150		2.808
	Steps	2.000	2.800	0.450	0.100		0.252
	room inside	2.000	2.400	2.400	0.120		1.382
	Wicket gate	2.000	3.140	(.9*.9)/4	0.300		0.382
	Building floor (All round)	2.000	17.200	1.500	0.150		7.740
	Gate portion	1.000	4.000	5.800	0.150		3.480
	rounding	1.000	2.849				2.849
	Total						**20.000**
						Total Quantity in cum	**20.000**
1.007	7.1.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	gate house						
	For walls-Foundation	2.000	10.400	0.600	0.600		7.488
	For walls-Basement	2.000	10.400	0.450	0.450		4.212
	Steps	2.000	2.800	0.450	0.200		0.504
	rounding	1.000	2.796				2.796
	Total						**15.000**
						Total Quantity in cum	**15.000**
1.008	OD308/2022-2023						
	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. All work upto plinth level 						
	Column Footing of Gate House						
	For main pillars	2.000	1.500	1.500	0.200		0.900
	For side pillars	2.000	1.200	1.200	0.200		0.576
	For main pillars - f r u s t u m 0 . 4 / 3 (A 1 + A 2) + s q . r o o t of(A1xA2) = A1 = 1.5x1.5 = 2.25, A2 = 1x0.40 = 0.40 = sq.root (A1xA2) = sq.root(2.25 x 0.40) = 0 . 9 5 2x0.4/3x(2.25+0. 4+0.9 5)=0.96	2.000	0.133	3.600			0.958
	For main pillars	2.000	0.900	0.300	0.950		0.513
	For side pillars	2.000	0.900	0.300	0.450		0.243
	Total						**3.190**
	Columns upto plinth level						
	For main pillars	2.000	0.900	0.300	0.450		0.243
	For side pillars	2.000	0.900	0.300	0.450		0.243

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**0.486**
						Total Quantity in cum	**3.676**
1.009	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	gate house column footing						
	For main pillars	2.000	(0.9+0.3) *2		0.950		4.560
	For side pillars	2.000	(0.9+0.3) *2		0.450		2.160
	Total						**6.720**
	Gate (Columns upto plinth level)						
	For main pillars	2.000	(.9+.3)*2		0.450		2.160
	For side pillars	2.000	(.9+.3)*2		0.450		2.160
	Total						**4.320**
						Total Quantity in sqm	**11.040**
1.010	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	For column above plinth level						
	Upto roof slab	2.000	2.400		4.250		20.400
	Top portion of Pillar	2.000	4.000		0.300		2.400
	For side pillars	2.000	2.400		2.550		12.240
	Total						**35.040**
						Total Quantity in sqm	**35.040**
1.011	OD309/2022-2023						
	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. All work above plinth level upto floor V level 						
	lintel						
	lintel over wall	2.000	10.400	0.200	0.150		0.624
	Total						**0.624**
	Roof slab						
	Sloped roof	2*2	3.700	2.180	0.100		3.226
	Parallel portion	2*2	0.900	1.170	0.100		0.421

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**3.647**
	Purgola						
	Purgola	4.000	7.400	0.200	0.600		3.552
	Purgola	5*3	0.200	0.300	0.300		0.270
	Total						**3.822**
	For column above plinth level						
	Upto roof slab	2.000	0.900	0.300	4.250		2.295
	Top portion of Pillar	2.000	1.700	0.300	0.300		0.306
	For side pillars	2.000	0.900	0.300	2.550		1.377
	Total						**3.978**
						Total Quantity in cum	**12.071**
1.012	5.22.6						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - Mechanically Treated bars of grade Fe-500D or more						
	steel						
	Column footing of gate house @ 80kg per m3	1.000	3.190			80.000000	255.200
	For column up to plinth level @ 120kg/m3 for item No.8	1.000	0.486			120.000000	58.320
	Total						**313.520**
						Total Quantity in kilogram	**313.520**
1.013	5.22A.6						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - Mechanically Treated bars of grade Fe-500D or more						
	Steel						
	For column above plinth level @ 160kg/m3	1.000	3.978			160.000000	636.480
	Lintel over wall @ 80kg/m3	1.000	0.624			80.000000	49.920
	Roof slab @100kg/m3	1.000	3.647			100.000000	364.700
	Purgolas @ 120kg/m3	1.000	3.822			120.000000	458.640
	Total						**1509.740**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in kg	**1509.740**
1.014	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	lintel						
	lintel over wall	2.000	10.280			0.300000	6.168
	Total						**6.168**
	Purgola						
	Purgola	4.000	7.400	1.400			41.440
		7*3	0.200	0.900			3.780
	Total						**45.220**
						Total Quantity in sqm	**51.388**
1.015	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Roof slab						
	Sloped roof	2*2	3.700	2.180			32.264
	Parallel portion	2*2	0.900	1.170			4.212
	Total						**36.476**
						Total Quantity in sqm	**36.476**
1.016	5.9.16.1						
	Centering and shuttering including strutting, etc. and removal of form for: Edges of slabs and breaks in floors and wallsUnder 20 cm wide						
	Roof slab edge						
	Sloped roof	2*2	(3.700+2.18)*2				47.040
	Parallel portion	2*2	(.9+1.17)*2				16.560
	Total						**63.600**
						Total Quantity in metre	**63.600**
1.017	50.6.1.5						
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x20cm or nearest available size confirming to IS 2185 Part I of 1979 for super structure up to floor two level thickness 20cm and above in: CM 1:6 (1 cement : 6 coarse sand) etc complete						
	gate house						
	Super structure	2.000	10.400	0.200	3.000		12.480
	Total						**12.480**
	deductions						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Doors	-2.000	1.000	0.200	2.100		-0.840
	windows	-3.000	1.000	0.200	1.400		-0.840
	Lintel	-1.000	10.400	0.200	0.150		-0.312
	Total						**-1.992**
						Total Quantity in cum	**10.488**
1.018	9.48.2						
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc						
	Details for 1.08 sqm						
	Window W,MS bar 16mm dia,1.58kg/m	2.000	1.000	1.400		15.231000	42.647
	Front gate,M.S. flat 2 5 x 3 . 1 5 m m , @ 0 . 6 3 k g / m	1.000	7.000	1.700		3.704000	44.078
	Total						**86.725**
						Total Quantity in kg	**86.725**
1.019	9.117.2						
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 42x50 mm						
	door						
	D	2.000	5.200				10.400
	Total						**10.400**
						Total Quantity in metre	**10.400**
1.020	9.118.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).						
	Door						
	D	2.000	1.000		2.100		4.200
	Total						**4.200**
						Total Quantity in sqm	**4.200**
1.021	5.23						
	Smooth finishing of the exposed surface of RCC work with 6mm thick cement mortar 1:3 (cement : 3 fine sand).						
	Purgola						
	Purgola	4.000	7.000	1.600			44.800
	Purgola	5*3	0.200	1.200			3.600
	Total						**48.400**
	pillars						
	For side pillars	2.000	2.400	2.550			12.240
	For main pillar Top	2.000	1.700	0.300			1.020
	-d0- head	2.000	4.000	0.300			2.400
	For main pillars	2.000	2.400	4.250			20.400
	Total						**36.060**
	ceiling						
	ceiling	1.000	7.600	2.030			15.428
		2*2	3.700	2.180			32.264
		2*2	0.900	1.170			4.212
	Total						**51.904**
						Total Quantity in sqm	**136.364**
1.022	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	plastering						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	inside wall	2.000	9.600		3.000		57.600
	Outer wall (remaining granite portion)	2.000	2.800		3.000		16.800
	Total						**74.400**
	deductions						
	door	-2.000	1.000		2.100		-4.200
	window	-3.000	1.000		1.400		-4.200
	Total						**-8.400**
						Total Quantity in sqm	**66.000**
1.023	11.41.2						
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.						
	flooring						
	room-floor	2.000	2.400	2.400			11.520
	steps	2.000	2.800	0.700			3.920
	Total						**15.440**
						Total Quantity in sqm	**15.440**
1.024	13.48.1						
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm						
	Gate house and roof (inside)						
	Inside wall	2.000	9.600	3.000			57.600
	Sloped roof (inside)	2*2	3.700	2.180			32.264
	Parallelportion(inside)	4.000	0.900	1.170			4.212
	Total						**94.076**
	deductions						
	Door	-2.000	1.000		2.100		-4.200
	window	-3.000	1.000		1.400		-4.200
	Total						**-8.400**
						Total Quantity in sqm	**85.676**
1.025	13.47.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)						
	outer side						
	Outer Wall (remaining granite portion)	2.000	2.800	3.000			16.800
	Purgolas	4.000	7.000	1.600			44.800
		5*3	0.200	1.200			3.600
	Total						**65.200**
	Pillars						
	For side pillars	2.000	2.400	2.550			12.240
	For main pillar Top	2.000	1.700	0.300			1.020
	-d0- head	2.000	4.000	0.300			2.400
	For main pillars	2.000	2.400	4.250			20.400
	Total						**36.060**
	roof						
	sloped roof(out side)	2*2	3.700	2.180			32.264
		2*2	0.900	1.170			4.212
	Total						**36.476**
						Total Quantity in sqm	**137.736**
1.026	13.52.1						
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work						
	painting						
	window	3.000	1.000	1.400			4.200
	Front gate	2.000	7.000	1.700			23.800
	Wicket gate	2*4	0.400	0.900			2.880
	Total						**30.880**
						Total Quantity in sqm	**30.880**
1.027	9.97.2						
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:250x10 mm						
	250x10mm tower bolt						
		2.000					2.000
	Total						**2.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in no	**2.000**
1.028	9.100.2						
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm						
	Al handle 100mm with plate 150mm x32mm						
		2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.029	12.47.1						
	Providing & fixing UV stabilised fibre glass reinforced plastic sheet rooting up to any pitch, including fixing with polymer coated 'J' or 'L' hooks, bolts & nuts 8 mm dia G.I plain/ bitumen washers complete but excluding the cost of purlins, rafters, trusses etc. The sheets shall be manufactured out of 2400 TEX panel rovings incorporating minimum 0.3% ultra-violet stabiliser in resin system under approxirnately 2400 psi and hot cured. They shall be of uniform pigmentation and thickness without air pockets and shall conform to IS 10192 and IS 12866. The sheets shall be opaque or translucent, clear or pigmented, textured or smooth as specified.2 mm thick corrugate 2.5"or 4.2" or 6") or step-down (2' or 3" or 6") as specified.						
	Details of cost for area of roof 2x18.09x5.1 = 184.518 sqm						
	Purgola roof	1.000	7.600	2.030			15.428
	Total						**15.428**
						Total Quantity in sqm	**15.428**
1.030	10.25.2						
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works						
	gate						
	Front gate - 33.6@ (14.5+.084)/2 kg/m	2.000	7.000		(14.5+.084)/2		102.088
	Wicket gate	4.000	0.900		(14.5+.084)/2		26.251
	Total						**128.339**
						Total Quantity in kg	**128.339**
1.031	21.1.1.3						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionPolyester powder coated aluminium (minimum thickness of polyester powder coating 50 micron)						
	Aluminium work						
	Door D-Weight @ 8.33kg/m2	2.000	1.000	2.100	8.330		34.986
	Al window	3.000	1.000	1.400	8.330		34.986
	Total						**69.972**
						Total Quantity in kg	**69.972**
1.032	21.1.2.3						
	For shutters of doors, windows & ventilators including providing and fixing hinges / pivots and making provision for fixing of fittings wherever required including the cost of EPDM rubber/ neoprene gasket required (Fittings shall be paid for separately)Polyester powder coated aluminium (minimum thickness of polyester powder coating 50 micorn)						
	shutters						
	Door D Weight @ 11.69kg/m	2.000	0.900	2.000	11.690		42.084
	Area of aluminium windows @11.69 kg/m	3.000	0.900	1.300	11.690		41.032
	Total						**83.116**
						Total Quantity in kg	**83.116**
1.033	21.3.1						
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 4.0 mm thickness						
	shutters						
	Area of aluminium door shutters	2.000	0.900	2.000			3.600
	Area of aluminium window shutters	3.000	0.900	1.300			3.510

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**7.110**
						Total Quantity in sqm	**7.110**
1.034	8.2.2.2						
	Providing and fixing 18 mm thick gang saw cut, mirror, polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations, of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.Area of slab over 0.50 sqm						
	gate house						
	Out side walls of ATM counter	3.000	2.800	3.000			25.200
	Out side walls of toll booth	3.000	2.800	3.000			25.200
	Compound wall front	2.000	10.000	1.200			24.000
	Name board	1.000	7.500	0.750			5.625
	Total						**80.025**
	deductions						
	Door	-2.000	1.000		2.100		-4.200
	window	-3.000	1.000		1.400		-4.200
	Total						**-8.400**
						Total Quantity in sqm	**71.625**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Construction of Internal Road, Parking area and Drainage facility-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Concrete road & drainage work**			
1.001	3.15.2			
	Compacting Original Ground (ii) Compacting original ground supporting subgrade Loosening of the ground upto a level of 300 mm below the subgrade level, watered, graded and compacted in layers to meet requirement of Tables 300.1 and 300.2 for subgrade construction as per Technical Specification Clause 303.5.2.			
	Net Total	3270.000cum	@62.02/cum	202805.40
1.002	3.2			
	Preparation of Foundation for Embankment Scarifying Existing Bituminous Surface to a Depth of 150 mm by Mechanical Means Scarifying the existing bituminous road surface to a depth of 150 mm and disposal of scarified material with a lift upto 3 m and lead upto 1000 m as per Technical Specification Clause 301.4.			
	Net Total	1200.000sqm	@9.63/sqm	11556.00
1.003	11.1.1.1			
	Excavation for Structures Earthwork in excavation for structures as per drawing and technical specifications Clause 305.1 including setting out, construction of shoring and bracing, removal of stumps and other deleterious material and disposal upto a lead of 50 m, dressing of sides and bottom and backfilling in trenches with excavated suitable material. I. Ordinary soil (i) Upto 3 m depth			
	Net Total	275.400cum	@750.44/cum	206671.18
1.004	3.4			
	Construction of Embankment with Material Obtained from Borrow Pits Construction of embankment with approved material obtained from borrow pits with a lift upto 1.5 m, transporting to site, spreading, grading to required slope and compacting to meet requirement of Tables 300.1 and 300.2 with a lead upto 1000 m as per Technical Specification Clause 301.5			
	Net Total	1716.800cum	@463.32/cum	795427.78
1.005	4.1.A.1			
	Granular Sub-base with Well Graded Material (Table 400.1) (A) By Mix in Place Method Construction of granular sub-base by providing well graded material, spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC, and compacting with smooth wheel roller to achieve the desired density, complete as per Technical Specification Clause 401. (i) For Grading I Material			
	Net Total	1092.000cum	@2917.23/cum	3185615.16
1.006	11.4.1.1			
	Providing concrete for plain/reinforced concrete in open foundations complete as per			

Sl No	Specification	Quantity	Rate	Amount
	drawings and technical specifications Clause 802, 803, 1202 & 1203 I. P.C.C grade M 10 (i) Nominal mix 1:3:6			
	Net Total	717.100cum	@7646.85/cum	5483556.14
1.007	11.4.3.1			
	Providing concrete for plain/reinforced concrete in open foundations complete as per drawings and technical specifications Clause 802, 803, 1202 & 1203 III. P.C.C. grade M 20 (i) Nominal mix (1:2:4)			
	Net Total	84.200cum	@8116.64/cum	683421.09
1.008	11.4.5			
	Providing concrete for plain/reinforced concrete in open foundations complete as per drawings and technical specifications Clause 802, 803, 1202 & 1203 V. R.C.C. grade M 25			
	Net Total	650.000cum	@8861.61/cum	5760046.50
1.009	11.8			
	Supplying, fitting and placingTMT bar reinforcement in foundation complete as per drawings and technical specifications Clauses 1000 and 1202			
	Net Total	19.500tonne	@86333.07/tonne	1683494.87
1.010	4.9			
	Wet Mix Macadam Providing, laying, spreading and compacting graded stone aggregate to wet mix macadam specification including premixing the material with water at OMC in mechanical mixer (Pug Mill), carriage of mixed material by tipper to site, laying in uniform layers in sub-base/base course on a well prepared sub-base and compacting with smooth wheel roller of 80 to 100kN weight to achieve the desired density including lighting, barricading and maintenance of diversion, etc as per Tables 400.11 & 400.12 and Technical Specification Clause 406. By Mechanical Means with 1 km lead			
	Net Total	444.000cum	@3255.46/cum	1445424.24
1.011	5.1.1a			
	Prime Coat :- Low porosity Providing and applying primer coat with bitumen emulsion (SS-1) on prepared surface of granular base including cleaning of road surface and spraying primer at the rate of 0.70-1.0 kg/sqm using mechanical means as per Technical Specification Clause 502			
	Net Total	2960.000sqm	@69.68/sqm	206252.80
1.012	5.2.3a			
	Tack Coat Providing and applying tack coat with Bitumen emulsion (RS-1) using emulsion distributor at the rate of 0.25 to 0.30 kg per sqm on the prepared granular surfaces treated with primer & cleaned with Hydraulic broom as per Technical Specification Clause 503.			
	Net Total	2960.000sqm	@14.44/sqm	42742.40
			Heading Total(Rs)	19707013.56
2	**Drain**			

Sl No	Specification	Quantity	Rate	Amount
2.001	13.7.1			
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	1300.000sqm	@393.71/sqm	511823.00
2.002	OD205/2022-2023			
	Laterite boulder masonry with hard departmental stone in foundation and plinth including levelling up with cement concrete 1:6:12 (one cement, six course sand , 12 graded stone aggregate 20mm nominal size),up to plinth level with cement mortar1:6 			
	Net Total	81.400cum	@4610.14/cum	375265.40
			Heading Total(Rs)	887088.40
3	**BM&BC**			
3.001	5.3.2.a			
	Providing and laying bituminous macadam with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading premixed with a bituminous binder (VG 30), transported to the site, laid over a previously prepared surface with paver finisher to the required grade, level, and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction For Grading II - (19 mm nominal size)			
	Net Total	148.000cum	@7787.76/cum	1152588.48
3.002	5.6.2.a			
	Providing and laying bituminous concrete with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with a bituminous binder(NRMB) @ 5.4 percent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level, and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 507 complete in all respects For Grading - II (13.2 mm Nominal Size)			
	Net Total	88.800cum	@12465.77/cum	1106960.38
3.003	8.13			
	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads on Bituminous Surface @ 250 gms per sqm area, the thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35. The finished surface to be level, uniform, and free from streaks and holes.			
	Net Total	148.000sqm	@494.43/sqm	73175.64
3.004	8.35			
	Providing and fixing reflective road studs (Raised Pavement Marker) of ' category A' made out of ASA/HIPS/ABS moulded body with shanks and conforming to ASTM D 4280, strong enough to support a load of more than 13.635 T when tested in accordance with ASTM D 4280, reflective panel confirming to ASTM D 788, and reflectivity conforming to clause 804.4. including installation, drilling, fixing with adhesive etc. with 2 years warranty for the road stud as well as for in field performance as per clause 804.7.3 Road Markers/Road Stud with Lense Reflector :-			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	300.000no	@195.85/no	58755.00
3.005	55.23			
	Supplying and laying interlocking tile 80mm or nearest size thickness, minimum strength M30 including providing a layer of 6mm aggregate for 5cm thickness, then laying interlock cobbles in lines and levels as per the directions of the departmental officers at site inclusive of all cost & conveyance charges etc. complete.			
	Net Total	888.000sqm	@946.36/sqm	840367.68
	Heading Total(Rs)			3231847.18
	Total Estimation PAC			23825949.14
5	**Extra Charges**			
4.001	Provision for GST			
	23825949.14		18.00%	4288670.85
	Grand Total			28114619.99
	Round off			85380.01
	Rounded Total(Rs)			28200000.00
	Rupees Two Crore Eighty Two Lakh			

PRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Construction of Internal Road, Parking area and Drainage facility-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Concrete road & drainage work						
1.001	3.15.2						
	Compacting Original Ground (ii) Compacting original ground supporting subgrade Loosening of the ground upto a level of 300 mm below the subgrade level, watered, graded and compacted in layers to meet requirement of Tables 300.1 and 300.2 for subgrade construction as per Technical Specification Clause 303.5.2.						
	parking Area						
	parking Area	1.000	60.000	23.000	0.500		690.000
		1.000	70.000	42.000	0.500		1470.000
	Total						**2160.000**
	For Road						
	Main road	1.000	370.000	10.000	0.300		1110.000
	Total						**1110.000**
						Total Quantity in cum	**3270.000**
1.002	3.2						
	Preparation of Foundation for Embankment Scarifying Existing Bituminous Surface to a Depth of 150 mm by Mechanical Means Scarifying the existing bituminous road surface to a depth of 150 mm and disposal of scarified material with a lift upto 3 m and lead upto 1000 m as per Technical Specification Clause 301.4.						
	existing road						
		1.000	300.000	4.000			1200.000
	Total						**1200.000**
						Total Quantity in sqm	**1200.000**
1.003	11.1.1.1						
	Excavation for Structures Earthwork in excavation for structures as per drawing and technical specifications Clause 305.1 including setting out, construction of shoring and bracing, removal of stumps and other deleterious material and disposal upto a lead of 50 m, dressing of sides and bottom and backfilling in trenches with excavated suitable material. I. Ordinary soil (i) Upto 3 m depth						
	Drainage						
	Drain around the parking area	1.000	364.000	1.000	0.600		218.400
	Drain from parking area to river	1.000	57.000	1.000	1.000		57.000
	Total						**275.400**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**275.400**
1.004	3.4						
	Construction of Embankment with Material Obtained from Borrow Pits Construction of embankment with approved material obtained from borrow pits with a lift upto 1.5 m, transporting to site, spreading, grading to required slope and compacting to meet requirement of Tables 300.1 and 300.2 with a lead upto 1000 m as per Technical Specification Clause 301.5						
	for road						
	Main road	1.000	370.000	11.600	0.400		1716.800
	Total						**1716.800**
						Total Quantity in cum	**1716.800**
1.005	4.1.A.1						
	Granular Sub-base with Well Graded Material (Table 400.1) (A) By Mix in Place Method Construction of granular sub-base by providing well graded material, spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC, and compacting with smooth wheel roller to achieve the desired density, complete as per Technical Specification Clause 401. (i) For Grading I Material						
	parking Area						
	parking Area	1.000	60.000	23.000	0.150		207.000
		1.000	70.000	42.000	0.150		441.000
	Total						**648.000**
	for Road						
	Main road	2.000	370.000	4.000	0.150		444.000
	Total						**444.000**
						Total Quantity in cum	**1092.000**
1.006	11.4.1.1						
	Providing concrete for plain/reinforced concrete in open foundations complete as per drawings and technical specifications Clause 802, 803, 1202 & 1203 I. P.C.C grade M 10 (i) Nominal mix 1:3:6						
	Parking Area						
	parking Area	1.000	60.000	23.000	0.100		138.000
		1.000	70.000	42.000	0.100		294.000
	Total						**432.000**
	Drainage						
	Drain around the Parking area	1.000	364.000	1.000	0.150		54.600
	drain from parking area to river	1.000	57.000	1.000	0.150		8.550
	Side wall	2.000	364.000	0.250	0.500		91.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Side wall	2.000	57.000	0.250	0.700		19.950
	Total						**174.100**
	For Road						
	Median kerb of road	2.000	370.000	0.300	0.300		66.600
	side kerb	2.000	370.000	0.300	0.200		44.400
	Total						**111.000**
						Total Quantity in cum	**717.100**
1.007	11.4.3.1						
	Providing concrete for plain/reinforced concrete in open foundations complete as per drawings and technical specifications Clause 802, 803, 1202 & 1203 III. P.C.C. grade M 20 (i) Nominal mix (1:2:4)						
	Drainage						
	Drain around the Parking area	1.000	364.000	1.000	0.050		18.200
	drain from parking area to river	1.000	57.000	1.000	0.050		2.850
	Drain around the Parking area Cover slab	1.000	364.000	1.000	0.150		54.600
	Drain from parking area to river cover slab	1.000	57.000	1.000	0.150		8.550
	Total						**84.200**
						Total Quantity in cum	**84.200**
1.008	11.4.5						
	Providing concrete for plain/reinforced concrete in open foundations complete as per drawings and technical specifications Clause 802, 803, 1202 & 1203 V. R.C.C. grade M 25						
	Parking Area						
	parking Area	1.000	60.000	23.000	0.150		207.000
		1.000	70.000	42.000	0.150		441.000
	Guard stone 15cm height 2m c/c on the side of parking area and drain	147.000	0.200	0.200	0.150		0.882
	rounding	1.000	1.118				1.118
	Total						**650.000**
						Total Quantity in cum	**650.000**
1.009	11.8						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying, fitting and placingTMT bar reinforcement in foundation complete as per drawings and technical specifications Clauses 1000 and 1202						
	steel						
	LS Wt taken as 30kg/m3 of concrete for road work	1.000	650.000			0.030000	19.500
	Total						**19.500**
						Total Quantity in tonne	**19.500**
1.010	4.9						
	Wet Mix Macadam Providing, laying, spreading and compacting graded stone aggregate to wet mix macadam specification including premixing the material with water at OMC in mechanical mixer (Pug Mill), carriage of mixed material by tipper to site, laying in uniform layers in sub-base/base course on a well prepared sub-base and compacting with smooth wheel roller of 80 to 100kN weight to achieve the desired density including lighting, barricading and maintenance of diversion, etc as per Tables 400.11 & 400.12 and Technical Specification Clause 406. By Mechanical Means with 1 km lead						
	for road						
	Main road both side	2.000	370.000	4.000	0.150		444.000
	Total						**444.000**
						Total Quantity in cum	**444.000**
1.011	5.1.1a						
	Prime Coat :- Low porosity Providing and applying primer coat with bitumen emulsion (SS-1) on prepared surface of granular base including cleaning of road surface and spraying primer at the rate of 0.70-1.0 kg/sqm using mechanical means as per Technical Specification Clause 502						
	For Road						
	Main road both side	2.000	370.000	4.000			2960.000
	Total						**2960.000**
						Total Quantity in sqm	**2960.000**
1.012	5.2.3a						
	Tack Coat Providing and applying tack coat with Bitumen emulsion (RS-1) using emulsion distributor at the rate of 0.25 to 0.30 kg per sqm on the prepared granular surfaces treated with primer & cleaned with Hydraulic broom as per Technical Specification Clause 503.						
	For Road						
	Main road both side	2.000	370.000	4.000			2960.000
	Total						**2960.000**
						Total Quantity in sqm	**2960.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
2	Drain						
2.001	13.7.1						
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)						
	Drainage						
	Drain around the Parking area	1.000	364.000	2.000			728.000
	drain from parking area to river	1.000	57.000	2.200			125.400
	Total						**853.400**
	For Road						
	boundary wall of road	2.000	370.000	0.600			444.000
	rounding	1.000	2.600				2.600
	Total						**446.600**
						Total Quantity in sqm	**1300.000**
2.002	OD205/2022-2023						
	Laterite boulder masonry with hard departmental stone in foundation and plinth including levelling up with cement concrete 1:6:12 (one cement, six course sand , 12 graded stone aggregate 20mm nominal size),up to plinth level with cement mortar1:6 						
	For Road						
	Boundary wall of the road	2.000	370.000	0.350	0.200		51.800
		2.000	370.000	0.200	0.200		29.600
	Total						**81.400**
						Total Quantity in cum	**81.400**
3	BM&BC						
3.001	5.3.2.a						
	Providing and laying bituminous macadam with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading premixed with a bituminous binder (VG 30), transported to the site, laid over a previously prepared surface with paver finisher to the required grade, level, and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction For Grading II - (19 mm nominal size)						
	Road on both sides						
		2.000	370.000	4.000	0.050		148.000
	Total						**148.000**
						Total Quantity in cum	**148.000**
3.002	5.6.2.a						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and laying bituminous concrete with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with a bituminous binder(NRMB) @ 5.4 percent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level, and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 507 complete in all respects For Grading - II (13.2 mm Nominal Size)						
	road both sides						
		2.000	370.000	4.000	0.030		88.800
	Total						**88.800**
						Total Quantity in cum	**88.800**
3.003	8.13						
	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads on Bituminous Surface @ 250 gms per sqm area, the thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35. The finished surface to be level, uniform, and free from streaks and holes.						
	line marks on sides						
		2*2	370.000	0.100			148.000
	Total						**148.000**
						Total Quantity in sqm	**148.000**
3.004	8.35						
	Providing and fixing reflective road studs (Raised Pavement Marker) of ' category A' made out of ASA/HIPS/ABS moulded body with shanks and conforming to ASTM D 4280, strong enough to support a load of more than 13.635 T when tested in accordance with ASTM D 4280, reflective panel confirming to ASTM D 788, and reflectivity conforming to clause 804.4. including installation, drilling, fixing with adhesive etc. with 2 years warranty for the road stud as well as for in field performance as per clause 804.7.3 Road Markers/Road Stud with Lense Reflector :-						
	for road sides						
	LS qty taken as 300	300.000					300.000
	Total						**300.000**
						Total Quantity in no	**300.000**
3.005	55.23						
	Supplying and laying interlocking tile 80mm or nearest size thickness, minimum strength M30 including providing a layer of 6mm aggregate for 5cm thickness, then laying interlock cobbles in lines and levels as per the directions of the departmental officers at site inclusive of all cost & conveyance charges etc. complete.						
	side berm						
		2.000	370.000	1.200			888.000
	Total						**888.000**
						Total Quantity in sqm	**888.000**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of Toilet block inside the Harbour-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Toilet Block**			
1.001	2.8.1			
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil			
	Net Total	79.230cum	@291.42/cum	23089.21
1.002	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	12.912cum	@6687.21/cum	86345.26
1.003	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	43.371cum	@7069.78/cum	306623.43
1.004	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	13.495cum	@9237.20/cum	124656.01
1.005	5.34.1			
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	27.592cum	@80.55/cum	2222.54
1.006	2.25			

Sl No	Specification	Quantity	Rate	Amount
	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m.			
	Net Total	21.577cum	@253.71/cum	5474.30
1.007	4.1.6			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)			
	Net Total	5.524cum	@7076.05/cum	39088.10
1.008	50.6.7.2			
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.			
	Net Total	31.496cum	@7872.96/cum	247966.75
1.009	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	14.097cum	@10858.36/cum	153070.30
1.010	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	25.200sqm	@329.03/sqm	8291.56
1.011	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	89.860sqm	@637.63/sqm	57297.43
1.012	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	75.135sqm	@800.47/sqm	60143.31
1.013	OD5549/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo -HCR			
	Net Total	2207.360kilogram	@96.62/kilogram	213275.12

Sl No	Specification	Quantity	Rate	Amount
1.014	13.1.1			
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	273.580sqm	@308.22/sqm	84322.83
1.015	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	87.550sqm	@262.57/sqm	22988.00
1.016	13.43.1			
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer			
	Net Total	155.580sqm	@69.33/sqm	10786.36
1.017	13.83.2			
	Wall painting with premium acrylic emulsion paint of interior grade, having VOC (Volatile including applying additional coats wherever required to achieve even shade and colour.Two coats			
	Net Total	146.880sqm	@131.59/sqm	19327.94
1.018	13.47.1			
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)			
	Net Total	99.830sqm	@186.15/sqm	18583.35
1.019	11.46.1			
	Providing and laying Vitrified tiles indifferent sizes (thickness to be specified by manufacturer), with water absorption less than 0.08 % and conforming to I.S. 15622, of approved make, in all colours & shade, in skirting, riser of steps, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand), including grouting the joint with white cement & matching pigments etc. complete.Size of Tile 500x500 mm			
	Net Total	112.930sqm	@1516.68/sqm	171278.67
1.020	50.9.1.1			
	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately), using good quality Anjili wood /jack wood			
	Net Total	0.187cum	@109412.10/cum	20460.06
1.021	50.9.3.1			
	Providing and fixing paneled or paneled and glazed shutters for doors, windows and clerestory windows, 30 mm thick shutters including ISI marked M.S. pressed butt hinges bright finished of required size with necessary screws, excluding paneling which will be paid for separately, all complete as per direction 0f Engineer in- charge. using Anjili/ Jack wood			
	Net Total	5.071sqm	@3002.91/sqm	15227.76
1.022	50.9.4.1			

Sl No	Specification	Quantity	Rate	Amount
	Providing and fixing paneling or paneling and glazing in paneled or paneled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured) paneling for paneled or paneled and glazed shutters 25 mm to 40 mm thick using good quality Anjili/ Jack wood			
	Net Total	0.986sqm	@2725.35/sqm	2687.20
1.023	50.9.5.1			
	Providing and fixing glazed shutters for doors, windows and clerestory windows using 4 mm thick float glass panes including ISI marked M.S pressed butt hinges bright finished of required size with necessary screws. Using Anjili wood/ jack wood 35 mm thick shutters.			
	Net Total	3.280sqm	@3924.72/sqm	12873.08
1.024	9.48.2			
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc			
	Net Total	44.100kg	@211.94/kg	9346.55
1.025	9.53			
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	10.000each	@207.00/each	2070.00
1.026	9.117.2			
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 42x50 mm			
	Net Total	20.000metre	@308.89/metre	6177.80
1.027	9.118.1			
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and			

Sl No	Specification	Quantity	Rate	Amount
	fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).			
	Net Total	6.720sqm	@2033.68/sqm	13666.33
1.028	50.9.15.1			
	Supplying and fixing 200 mm Aluminium aldrop			
	Net Total	5.000no	@171.51/no	857.55
1.029	9.63.3			
	Providing and fixing ISI marked oxidised M.S. tower bolt black finish, (Barrel type) with necessary screws etc. complete:150x10 mm			
	Net Total	5.000no	@60.70/no	303.50
1.030	14.35.3			
	Providing and fixing finished brass hard drawn hooks and eyes:200 mm			
	Net Total	14.000no	@85.95/no	1203.30
1.031	14.35.5			
	Providing and fixing finished brass hard drawn hooks and eyes:100 mm			
	Net Total	11.000no	@60.44/no	664.84
1.032	9.66.1			
	Providing and fixing ISI marked oxidised M.S. handles conforming to IS : 4992 with necessary screws etc. complete:125 mm			
	Net Total	1.000no	@40.27/no	40.27
1.033	13.85.1			
	Applying priming coats with primer of approved brand and manufacture, having low VOC (Volatile Organic Compound) content.With ready mixed pink or grey primer on wood work (hard and soft wood) having VOC content less than 50 grams/ litre			
	Net Total	12.516sqm	@65.91/sqm	824.93
1.034	13.61.1			
	Painting with synthetic enamel paint of approved brand and manufacture to give an even shade:Two or more coats on new work			
	Net Total	11.318sqm	@140.37/sqm	1588.71
1.035	13.52.1			
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work			
	Net Total	13.945sqm	@219.17/sqm	3056.33
1.036	17.3.2			
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.c. pan with ISI marked black solid plastic seat			

Sl No	Specification	Quantity	Rate	Amount
	and lid			
	Net Total	4.000each	@7582.40/each	30329.60
1.037	50.17.1.4			
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.			
	Net Total	4.000no	@758.07/no	3032.28
1.038	17.4.1			
	Providing and fixing white vitreous china flat back or wall corner type lipped front urinal basin of 430x260x350 mm and 340x410x265 mm sizes respectively with automatic flushing cistern with standard flush pipe and C.P. brass spreaders with brass unions and G.I. clamps complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required:One urinal basin with 5 litre white P.V.C. automatic flushing cistern			
	Net Total	4.000each	@5754.71/each	23018.84
1.039	17.7.2			
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 630 x 450 mm with a single 15 mm C.P. brass pillar tap			
	Net Total	6.000each	@3177.85/each	19067.10
1.040	18.48			
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.			
	Net Total	3000.000Litre	@10.18/Litre	30540.00
1.041	50.18.9.9.2			
	Providing and fixing PVC pipes includes joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in CHarge. 110 mm dia 4 Kg/cm2			
	Net Total	50.000metre	@471.14/metre	23557.00
1.042	50.18.9.7.2			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge.63 mm dia 4 Kgf/cm2			
	Net Total	50.000metre	@300.47/metre	15023.50
1.043	50.18.7.4.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 10Kgf/cm2- Internal work - Exposed on wall			
	Net Total	150.000metre	@313.08/metre	46962.00

Sl No	Specification	Quantity	Rate	Amount
1.044	50.18.8.3.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 25 mm pipe 10kgf /cm2			
	Net Total	150.000metre	@414.35/metre	62152.50
1.045	50.18.9.20.3			
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 63 mm dia Door Elbow			
	Net Total	6.000no	@79.76/no	478.56
1.046	50.18.9.22.3			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement-110 mm dia Door Elbow			
	Net Total	4.000no	@131.22/no	524.88
1.047	50.18.9.22.4			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement- 110 mm dia Bend			
	Net Total	4.000no	@160.26/no	641.04
1.048	50.18.9.22.6			
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 110x110x110 mm dia Door tee			
	Net Total	4.000no	@186.75/no	747.00
1.049	50.17.1.1			
	Supplying and fixing Stainless steel soap dish including cost of materials and labour charges etc complete as per the direction of site Engineer-in-charge.			
	Net Total	10.000no	@66.98/no	669.80
1.050	50.17.1.3			
	Supplying and fixing CP Towel rod 60cm or nearest available length including cost of materials and labour charges etc complete as per the direction of site Engineer-in-charge.			
	Net Total	6.000no	@128.14/no	768.84
1.051	50.18.9.21.7			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Vent cowl			
	Net Total	4.000no	@86.15/no	344.60
1.052	18.58.1.1			
	Providing and fixing PTMT grating of approved quality and colour. Circular type100 mm nominal dia			
	Net Total	10.000each	@43.76/each	437.60
1.053	19.4.1.1			
	Providing and fixing square-mouth S.W. gully trap class SP -1 complete with C.I. grating brick masonry chamber with water tight C.I. cover with frame of 300x300 mm size (inside) the weight of cover to be not less than 4.50 kg and frame to be not less than 3.20 kg as per standard design: 100x100 mm size P typeWith common burnt clay F.P.S. (non modular) bricks of class designation 7.5			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	4.000each	@2664.66/each	10658.64
1.054	18.18.2			
	Providing and fixing ball valve (brass) of approved quality, High or low pressure, with plastic floats complete:20 mm nominal bore			
	Net Total	5.000each	@446.34/each	2231.70
1.055	18.51.1			
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore			
	Net Total	20.000each	@637.96/each	12759.20
1.056	17.31			
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.			
	Net Total	2.000each	@1481.95/each	2963.90
1.057	10.3			
	Providing and fixing in position collapsible steel shutters with vertical channels 20x10x2 mm and braced with flat iron diagonals 20x5 mm size, with top and bottom rail of T-iron 40x40x6 mm, with 40 mm dia steel pulleys, complete with bolts, nuts,locking arrangement, stoppers, handles, including applying a priming coat of approved steel primer .			
	Net Total	4.500sqm	@10014.78/sqm	45066.51
1.058	19.7.1.2			
	Constructing brick masonry manhole in cement mortar 1:4 (1 cement : 4 coarse sand) with R.C.C. top with 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size), foundation concrete 1:4:8 mix (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size,) inside plastering 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with floating coat of neat cement and making channels in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement complete as per standard design: Inside size 90x80 cm and 45 cm deep including C.I. cover with frame (light duty) 455x610 mm internal dimensions, total weight of cover and frame to be not less than 38 kg (weigh of cover 23 kg and weight of frame 15 kg):With Sewer bricks conforming to IS : 4885			
	Net Total	1.000each	@12608.11/each	12608.11
1.059	19.33			
	Constructing soak pit 1.20x1.20 m filled with brickbats including S.W. drain pipe 100 mm diameter and 1.20 m long complete as per standard design.			
	Net Total	3.000each	@3012.28/each	9036.84
1.060	19.15.1			
	Providing M.S. foot rests including fixing in manholes with 20x20x10 cm cement concrete blocks 1:3:6 (1 cement : 3 coarse sand: 6 graded stone aggregate 20 mm nominal size) as per standard design.With 20x20 mm square bar			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	1.000each	@487.68/each	487.68
1.061	10.2			
	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.			
	Net Total	117.400kg	@117.55/kg	13800.37
	Heading Total(Rs)			2113786.77
	Total Estimation PAC			2113786.77
3	**Extra Charges**			
2.001	Provision for GST			
	2113786.77		18.00%	380481.62
	Grand Total			2494268.39
	Round off			5731.61
	Rounded Total(Rs)			2500000.00
	Rupees Twenty Five Lakh			

PRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of Toilet block inside the Harbour-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Toilet Block						
1.001	2.8.1						
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil						
	Earthwork						
	Long wall	2.000	13.900	0.800	0.750		16.680
	Short wall	3.000	4.800	0.800	0.750		8.640
	Tank- LW	2.000	3.400	0.800	0.750		4.080
	Tank -SW	2.000	1.500	0.800	0.750		1.800
	W/C - LW	4.000	2.000	0.800	0.750		4.800
	W/C - SW	3.000	1.700	0.800	0.750		3.060
	Wash area- LW	1.000	1.900	0.800	0.750		1.140
	Wash area- SW	1.000	1.700	0.800	0.750		1.020
	Wash area- LW	1.000	1.900	0.800	0.750		1.140
	Cloak room- LW	1.000	3.300	0.800	0.750		1.980
	Cloak room- SW	1.000	1.800	0.800	0.750		1.080
	Courtyard	1.000	1.400	0.800	0.750		0.840
	Step	1.000	1.500	0.600	0.150		0.135
	Step	1.000	2.000	0.600	0.150		0.180
	Septic tank	1.000	5.500	2.100	1.500		17.325
	Soak pit	3.000	1.400	1.400	1.000		5.880
	Column	6.000	1.500	1.500	0.700		9.450
	Total						**79.230**
						Total Quantity in cum	**79.230**
1.002	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	PCC						
	Long wall	2.000	13.900	0.800	0.150		3.336
	Short wall	3.000	4.800	0.800	0.150		1.728

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Tank- LW	2.000	3.400	0.800	0.150		0.816
	Tank -SW	2.000	1.500	0.800	0.150		0.360
	W/C - LW	4.000	2.000	0.800	0.150		0.960
	W/C - SW	3.000	1.700	0.800	0.150		0.612
	Wash area- LW	1.000	1.900	0.800	0.150		0.228
	Wash area- SW	1.000	1.700	0.800	0.150		0.204
	Wash area- LW	1.000	1.900	0.800	0.150		0.228
	Cloak room- LW	1.000	3.300	0.800	0.150		0.396
	Cloak room- SW	1.000	1.800	0.800	0.150		0.216
	Courtyard	1.000	1.400	0.800	0.150		0.168
	Column	6.000	1.500	1.500	0.100		1.350
	Septic tank	1.000	5.500	2.100	0.200		2.310
	Total						**12.912**
						Total Quantity in cum	**12.912**
1.003	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	RR masonry						
	Foundation-Long wall	2.000	13.900	0.600	0.600		10.008
	Foundation-Short wall	3.000	4.800	0.600	0.600		5.184
	Foundation-Tank- LW	2.000	3.400	0.600	0.600		2.448
	Foundation-Tank -SW	2.000	1.500	0.600	0.600		1.080
	Foundation-W/C - LW	4.000	2.000	0.600	0.600		2.880
	Foundation-W/C - SW	3.000	1.700	0.600	0.600		1.836
	Foundation-Wash area- LW	1.000	1.900	0.600	0.600		0.684
	Foundation-Wash area- SW	1.000	1.700	0.600	0.600		0.612
	Foundation-Wash area- LW	1.000	1.900	0.600	0.600		0.684
	Foundation-Cloak room- LW	1.000	3.300	0.600	0.600		1.188
	Foundation-Cloak room- SW	1.000	1.800	0.600	0.600		0.648

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Foundation-Courtyard	1.000	1.400	0.600	0.600		0.504
	Basement-Long wall	2.000	13.900	0.450	0.450		5.630
	Basement-Short wall	3.000	4.800	0.450	0.450		2.916
	Basement-Tank-LW	2.000	3.400	0.450	0.450		1.377
	Basement-Tank - SW	2.000	1.500	0.450	0.450		0.608
	Basement-W/C - LW	4.000	2.000	0.450	0.450		1.620
	Basement-W/C - SW	3.000	1.700	0.450	0.450		1.033
	Basement-Wash area- LW	1.000	1.900	0.450	0.450		0.385
	Basement-Wash area- SW	1.000	1.700	0.450	0.450		0.344
	Basement-Wash area- LW	1.000	1.900	0.450	0.450		0.385
	Basement-Cloak room- LW	1.000	3.300	0.450	0.450		0.668
	Basement-Cloak room- SW	1.000	1.800	0.450	0.450		0.365
	Basement-Courtyard	1.000	1.400	0.450	0.450		0.284
	Total						**43.371**
						Total Quantity in cum	**43.371**
1.004	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	Rcc up to plinth level						
	Basement-Long wall	2.000	13.900	0.450	0.100		1.251
	Basement-Short wall	3.000	4.800	0.450	0.100		0.648
	Basement-Tank-LW	2.000	3.400	0.450	0.100		0.306

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Basement-Tank - SW	2.000	1.500	0.450	0.100		0.135
	Basement-W/C - LW	4.000	2.000	0.450	0.100		0.360
	Basement-W/C - SW	3.000	1.700	0.450	0.100		0.230
	Basement-Wash area- LW	1.000	1.900	0.450	0.100		0.086
	Basement-Wash area- SW	1.000	1.700	0.450	0.100		0.077
	Basement-Wash area- LW	1.000	1.900	0.450	0.100		0.086
	Basement-Cloak room- LW	1.000	3.300	0.450	0.100		0.149
	Basement-Cloak room- SW	1.000	1.800	0.450	0.100		0.081
	Basement-Courtyard	1.000	1.400	0.450	0.100		0.063
	Column footing	6.000	1.400	1.400	0.300		3.528
		6.000	0.800	0.800	0.300		1.152
	Septic tank bed	1.000	5.300	1.900	0.150		1.511
	Side wall	1.000	14.400	0.150	1.700		3.672
	Baffle wall	2.000	1.600	0.050	1.000		0.160
	Total						**13.495**
						Total Quantity in cum	**13.495**
1.005	5.34.1						
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	Rcc up to plinth level						
	Basement-Long wall	2.000	13.900	0.450	0.100		1.251
	Basement-Short wall	3.000	4.800	0.450	0.100		0.648
	Basement-Tank-LW	2.000	3.400	0.450	0.100		0.306
	Basement-Tank - SW	2.000	1.500	0.450	0.100		0.135
	Basement-W/C - LW	4.000	2.000	0.450	0.100		0.360
	Basement-W/C - SW	3.000	1.700	0.450	0.100		0.230

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Basement-Wash area- LW	1.000	1.900	0.450	0.100		0.086
	Basement-Wash area- SW	1.000	1.700	0.450	0.100		0.077
	Basement-Wash area- LW	1.000	1.900	0.450	0.100		0.086
	Basement-Cloak room- LW	1.000	3.300	0.450	0.100		0.149
	Basement-Cloak room- SW	1.000	1.800	0.450	0.100		0.081
	Basement-Courtyard	1.000	1.400	0.450	0.100		0.063
	Column footing	6.000	1.400	1.400	0.300		3.528
		6.000	0.800	0.800	0.300		1.152
	Septic tank bed	1.000	5.300	1.900	0.150		1.511
	Side wall	1.000	14.400	0.150	1.700		3.672
	Baffle wall	2.000	1.600	0.050	1.000		0.160
	Total						**13.495**
	Lintel						
		2.000	8.400	0.200	0.150		0.504
		1.000	3.000	0.200	0.150		0.090
		3.000	5.000	0.200	0.150		0.450
		1.000	6.600	0.200	0.150		0.198
	Total						**1.242**
	Beam						
		2.000	8.400	0.300	0.300		1.512
		3.000	3.000	0.300	0.300		0.810
	Total						**2.322**
	Sunshade						
		1.000	8.400	0.600	0.100		0.504
		1.000	3.000	0.600	0.100		0.180
		1.000	5.000	0.600	0.100		0.300
		1.000	6.600	0.600	0.100		0.396
	Total						**1.380**
	Roof						
	Roof	1.000	8.900	5.600	0.150		7.476
	Deduction-courtyard	-1.000	2.000	1.700	0.150		-0.510
	Deduction- wash area	-1.000	1.800	1.100	0.150		-0.297

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**6.669**
	column						
		6.000	0.400	0.300	3.450		2.484
	Total						**2.484**
						Total Quantity in cum	**27.592**
1.006	2.25						
	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m.						
	Earth filling						
	Bath area & wash area	1.000	10.300	1.100	0.250		2.833
	Bath area	1.000	1.000	3.000	0.250		0.750
	Tank and passage around	1.000	2.900	3.700	0.450		4.829
	Passage	1.000	2.600	0.600	0.450		0.702
	w/c	4.000	1.800	1.200	0.450		3.888
	Cloak room	1.000	1.800	2.300	0.450		1.863
	Courtyard	1.000	2.000	1.700	0.450		1.530
	Wash area	1.000	1.200	0.800	0.250		0.240
	Wash area	1.000	1.400	0.800	0.250		0.280
	Passage + hand wash area	1.000	3.300	2.400	0.450		3.564
	Passage + urinal	1.000	2.000	0.800	0.450		0.720
	Passage infront of wash area	1.000	0.600	1.400	0.450		0.378
	Total						**21.577**
						Total Quantity in cum	**21.577**
1.007	4.1.6						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)						
	CC Flooring						
	Bath area & wash area	1.000	10.300	1.100	0.100		1.133
	Bath area	1.000	1.000	3.000	0.100		0.300
	Tank and passage around	1.000	2.900	3.700	0.100		1.073
	Passage	1.000	2.600	0.600	0.100		0.156
	w/c	4.000	1.800	1.200	0.100		0.864

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Cloak room	1.000	1.800	2.300	0.100		0.414
	Courtyard	1.000	2.000	1.700	0.100		0.340
	Wash area	1.000	1.200	0.800	0.100		0.096
	Wash area	1.000	1.400	0.800	0.100		0.112
	Passage + hand wash area	1.000	3.300	2.400	0.100		0.792
	Passage + urinal	1.000	2.000	0.800	0.100		0.160
	Passage infront of wash area	1.000	0.600	1.400	0.100		0.084
	Total						**5.524**
						Total Quantity in cum	**5.524**
1.008	50.6.7.2						
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.						
	Laterite masonry						
	Bath area	1.000	16.500	0.100	1.000		1.650
	Cloak room-front wall	1.000	2.900	0.100	1.000		0.290
	Cloak room	1.000	7.000	0.200	3.000		4.200
	outer wall- LW	1.000	8.300	0.200	3.000		4.980
	outer wall-SW	1.000	5.000	0.200	3.000		3.000
	W/C - LW	2.000	8.300	0.200	3.000		9.960
	W/C - SW	4.000	1.200	0.200	3.000		2.880
	Wash area	2.000	2.400	0.200	3.000		2.880
	urinal	1.000	0.600	0.200	3.000		0.360
	wall near step	2.000	0.200	0.200	3.000		0.240
	Basement-Outer wall	1.000	40.000	0.450	0.450		8.100
	Basement-Wash area	2.000	4.000	0.450	0.450		1.620
	Basement-Cloak room- LW	2.000	3.300	0.450	0.450		1.337
	Basement-Cloak room- SW	2.000	1.800	0.450	0.450		0.729
	Basement-Courtyard	1.000	5.000	0.450	0.450		1.013
	Basement-urinal	1.000	0.600	0.450	0.450		0.122
	Step	1.000	1.500	0.600	0.300		0.270
		1.000	1.500	0.300	0.300		0.135
	Step	1.000	2.000	0.600	0.300		0.360

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		1.000	2.000	0.300	0.300		0.180
	Deduction - Door	-4.000	1.000		2.100		-8.400
	Deduction - window	-1.000	1.500		1.500		-2.250
	Deduction - ventilator	-4.000	0.900		0.600		-2.160
	Total						**31.496**
						Total Quantity in cum	**31.496**
1.009	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	Lintel						
		2.000	8.400	0.200	0.150		0.504
		1.000	3.000	0.200	0.150		0.090
		3.000	5.000	0.200	0.150		0.450
		1.000	6.600	0.200	0.150		0.198
	Total						**1.242**
	Beam						
		2.000	8.400	0.300	0.300		1.512
		3.000	3.000	0.300	0.300		0.810
	Total						**2.322**
	Sunshade						
		1.000	8.400	0.600	0.100		0.504
		1.000	3.000	0.600	0.100		0.180
		1.000	5.000	0.600	0.100		0.300
		1.000	6.600	0.600	0.100		0.396
	Total						**1.380**
	Roof						
	Roof	1.000	8.900	5.600	0.150		7.476
	Deduction- courtyard	-1.000	2.000	1.700	0.150		-0.510
	Deduction- wash area	-1.000	1.800	1.100	0.150		-0.297
	Total						**6.669**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	column						
		6.000	0.400	0.300	3.450		2.484
	Total						**2.484**
						Total Quantity in cum	**14.097**
1.010	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	centering and suttering						
	Column	6.000	1.400		3.000		25.200
	Total						**25.200**
						Total Quantity in sqm	**25.200**
1.011	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	shuttering						
	Lintel	2.000	34.800		0.150		10.440
		2.000	7.800		0.150		2.340
	Beam Bottom	2.000	16.800	0.300			10.080
	Side	2.000	16.800		0.150		5.040
	Beam Bottom	2.000	9.600	0.300			5.760
	Side	2.000	9.600		0.150		2.880
	Septic tank outside all round	1.000	14.400		1.700		24.480
	Septic tank inside all round	1.000	13.200		1.700		22.440
	Baffle wall	4.000	1.600		1.000		6.400
	Total						**89.860**
						Total Quantity in sqm	**89.860**
1.012	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	centering and shuttering						
	Roof slab Bottom	1.000	8.000	3.000			24.000
	Roof slab Bottom	1.000	5.000	2.300			11.500
	Roof slab Side	1.000	28.500		0.150		4.275
	Septic tank cover	1.000	5.000	1.600			8.000
	Septic tank all side	1.000	14.400		1.700		24.480

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Septic tank all side	1.000	14.400	0.200			2.880
	Total						**75.135**
						Total Quantity in sqm	**75.135**
1.013	OD5549/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo -HCR						
	steel						
	LS quantity of 80kg/m3	27.592				80.000000	2207.360
	Total						**2207.360**
						Total Quantity in kilogram	**2207.360**
1.014	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	Wall plastering						
	Bath area internal wall	2.000	4.800		1.000		9.600
	Bath area external wall	2.000	5.000		1.000+.1		11.000
	Bath area internal wall	1.000	6.800		1.000		6.800
	Bath area external wall	1.000	6.900		1.000+.1		7.590
	Tank internal long wall	2.000	2.700		1.000		5.400
	Tank external long wall	2.000	2.900		1.000+.2		6.960
	Tank internal short wall	1.000	1.500		1.000		1.500
	Tank external short wall	1.000	1.900		1.000+.2		2.280
	External long wall	1.000	8.400		3.000		25.200
	External short wall	2.000	3.400		3.000		20.400
	W/C internal long wall	12.000	1.800		3.000		64.800
	W/C internal short wall	8.000	1.200		3.000		28.800
	Wash area wall	3.000	1.400		3.000		12.600
	Cloak room long wall	3.000	2.500		3.000		22.500

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Cloak room short wall	1.000	1.800		3.000		5.400
	Cloak room half wall	2.000	2.700		1.000+.2		6.480
	Urinal long wall	1.000	2.000		3.000		6.000
	Urinal short wall	1.000	0.800		3.000		2.400
	Courtyard wall	1.000	3.400		3.000		10.200
	Wash area long wall	1.000	1.400		3.000		4.200
	Wash area short wall	2.000	1.000		3.000		6.000
	Basement	2.000	14.000		0.450		12.600
		2.000	5.000		0.450		4.500
	Step	2.000	1.500		0.600		1.800
		2.000	0.900		0.300		0.540
	Step	2.000	2.000		0.600		2.400
		2.000	0.900		0.300		0.540
	Deduction - Door	-4.000	1.000		2.100		-8.400
	Deduction - window	-1.000	1.500		1.500		-2.250
	Deduction - ventilator	-4.000	0.900		0.600		-2.160
	Deduction - step	-1.000	1.500		0.600		-0.900
	Deduction - step	-1.000	2.000		0.600		-1.200
	Total						**273.580**
						Total Quantity in sqm	**273.580**
1.015	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	Ceiling						
	W/C	4.000	1.800	1.200			8.640
	Wash area	1.000	1.400	1.500			2.100
	Cloak room	1.000	2.300	1.800			4.140
	Urinal	1.000	2.500	0.800			2.000
	Hand wash area	1.000	3.300	2.400			7.920
	Courtyard wall	1.000	2.000	1.700			3.400
	Hand wash area	1.000	1.800	1.500			2.700
	Beam	4.000	3.600	0.900			12.960
		3.000	2.700	0.900			7.290
	Sunshade long wall	1.000	9.600	1.300			12.480

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Sunshade short wall	1.000	5.600	1.300			7.280
		1.000	3.800	1.300			4.940
		1.000	2.400	1.300			3.120
		1.000	6.600	1.300			8.580
	Total						**87.550**
						Total Quantity in sqm	**87.550**
1.016	13.43.1						
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	Primer						
	W/C internal long wall	12.000	1.800		3.000		64.800
	W/C internal short wall	8.000	1.200		3.000		28.800
	Wash area wall	3.000	1.400		3.000		12.600
	Cloak room long wall	3.000	2.500		3.000		22.500
	Cloak room short wall	1.000	1.800		3.000		5.400
	Cloak room half wall	1.000	2.700		1.000+.2		3.240
	Urinal long wall	1.000	2.000		3.000		6.000
	Urinal short wall	1.000	0.800		3.000		2.400
	Courtyard wall	1.000	3.400		3.000		10.200
	Wash area long wall	1.000	1.400		3.000		4.200
	Wash area short wall	2.000	1.000		3.000		6.000
	Deduction - Door	-4.000	1.000		2.100		-8.400
	Deduction - window	-1.000	1.500		1.500		-2.250
	Deduction - ventilator	-4.000	0.900		0.600		-2.160
	Deduction - step	-1.000	1.500		0.600		-0.900
	Deduction - step	-1.000	2.000		0.600		-1.200
	W/C	4.000	1.800	1.200			8.640
	Wash area	1.000	1.400	1.500			2.100
	Cloak room	1.000	2.300	1.800			4.140
	Urinal	1.000	2.500	0.800			2.000
	Hand wash area	1.000	3.300	2.400			7.920

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Courtyard wall	1.000	2.000	1.700			3.400
	Hand wash area	1.000	1.800	1.500			2.700
	Beam	4.000	3.600	0.900			12.960
		3.000	2.700	0.900			7.290
	Deduction w/c wall	-12.000	1.800		1.500		-32.400
	Deduction w/c wall	-8.000	1.200		1.500		-14.400
	Total						**155.580**
						Total Quantity in sqm	**155.580**
1.017	13.83.2						
	Wall painting with premium acrylic emulsion paint of interior grade, having VOC (Volatile including applying additional coats wherever required to achieve even shade and colour.Two coats						
	Interior painting						
	W/C internal long wall	8.000	1.800		3.000		43.200
	W/C internal short wall	8.000	1.200		3.000		28.800
	Wash area wall	3.000	1.400		3.000		12.600
	Cloak room long wall	3.000	2.500		3.000		22.500
	Cloak room short wall	1.000	1.800		3.000		5.400
	Cloak room half wall	1.000	2.700		1.000+.2		3.240
	Urinal long wall	1.000	2.000		3.000		6.000
	Urinal short wall	1.000	0.800		3.000		2.400
	Courtyard wall	1.000	3.400		3.000		10.200
	Wash area long wall	1.000	1.400		3.000		4.200
	Wash area short wall	2.000	1.000		3.000		6.000
	Deduction - Door	-4.000	1.000		2.100		-8.400
	Deduction - window	-1.000	1.500		1.500		-2.250
	Deduction - ventilator	-4.000	0.900		0.600		-2.160
	W/C	4.000	1.800	1.200			8.640
	Wash area	1.000	1.400	1.500			2.100
	Cloak room	1.000	2.300	1.800			4.140
	Urinal	1.000	2.500	0.800			2.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Hand wash area	1.000	3.300	2.400			7.920
	Courtyard wall	1.000	2.000	1.700			3.400
	Hand wash area	1.000	1.800	1.500			2.700
	Beam	4.000	3.600	0.900			12.960
		3.000	2.700	0.900			7.290
	Deduction w/c wall	-8.000	1.800		1.500		-21.600
	Deduction w/c wall	-8.000	1.200		1.500		-14.400
	Total						**146.880**
						Total Quantity in sqm	**146.880**
1.018	13.47.1						
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)						
	Exterior painting						
	Bath area external wall	2.000	5.000		1.000+.1		11.000
	Bath area internal wall	1.000	6.800		1.000		6.800
	Bath area external wall	1.000	6.900		1.000+.1		7.590
	Tank internal short wall	1.000	1.500		1.000		1.500
	External long wall	1.000	8.400		3.000		25.200
	External short wall	2.000	3.400		3.000		20.400
	Wash area wall	3.000	1.400		3.000		12.600
	Basement	2.000	14.000		0.500		14.000
		2.000	5.000		0.500		5.000
	Deduction - ventilator	-4.000	0.900		0.600		-2.160
	Deduction - step	-1.000	1.500		0.600		-0.900
	Deduction - step	-1.000	2.000		0.600		-1.200
	Total						**99.830**
						Total Quantity in sqm	**99.830**
1.019	11.46.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and laying Vitrified tiles indifferent sizes (thickness to be specified by manufacturer), with water absorption less than 0.08 % and conforming to I.S. 15622, of approved make, in all colours & shade, in skirting, riser of steps, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand), including grouting the joint with white cement & matching pigments etc. complete.Size of Tile 500x500 mm						
	Wall & floor tiles						
	w/c	4.000	1.800	1.200			8.640
	Cloak room	1.000	20.000	2.500			50.000
	Courtyard	1.000	2.200	1.700			3.740
	Wash area	1.000	1.400	0.900			1.260
	Wash area	1.000	1.600	0.900			1.440
	Passage + hand wash area	1.000	3.500	2.600			9.100
	Passage + urinal	1.000	2.100	0.900			1.890
	Passage infront of wash area	1.000	0.700	1.400			0.980
	Step	2.000	1.500		0.600		1.800
		2.000	0.900		0.300		0.540
	Step	2.000	2.000		0.600		2.400
		2.000	0.900		0.300		0.540
	For wall w/c	4.000	5.100		1.500		30.600
	Total						**112.930**
						Total Quantity in sqm	**112.930**
1.020	50.9.1.1						
	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately), using good quality Anjili wood /jack wood						
	Frame						
	Door - V	1*2	0.100	0.070	2.100		0.029
	Door - H	1*1	1.200	0.070	0.100		0.008
	Window - Verticals	1*4	0.100	0.070	1.500		0.042
	Window- Horizontal	1*2	1.700	0.070	0.100		0.024
	Ventilator	4*2	0.900	0.100	0.070		0.050
	Ventilator	4*2	0.600	0.100	0.070		0.034
	Total						**0.187**
						Total Quantity in cum	**0.187**
1.021	50.9.3.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing paneled or paneled and glazed shutters for doors, windows and clerestory windows, 30 mm thick shutters including ISI marked M.S. pressed butt hinges bright finished of required size with necessary screws, excluding paneling which will be paid for separately, all complete as per direction 0f Engineer in- charge. using Anjili/ Jack wood						
	Shutter						
	Door	1.000	2.000		1.000		2.000
	Window	1*3	0.410		1.360		1.673
	Ventilator	4.000	0.460		0.760		1.398
	Total						**5.071**
						Total Quantity in sqm	**5.071**
1.022	50.9.4.1						
	Providing and fixing paneling or paneling and glazing in paneled or paneled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured) paneling for paneled or paneled and glazed shutters 25 mm to 40 mm thick using good quality Anjili/ Jack wood						
	Panel						
	Door	4.000	0.850	0.290			0.986
	Total						**0.986**
						Total Quantity in sqm	**0.986**
1.023	50.9.5.1						
	Providing and fixing glazed shutters for doors, windows and clerestory windows using 4 mm thick float glass panes including ISI marked M.S pressed butt hinges bright finished of required size with necessary screws. Using Anjili wood/ jack wood 35 mm thick shutters.						
	window glass						
	window	1*3	1.400	0.400			1.680
	ventilator	1*4	0.800	0.500			1.600
	Total						**3.280**
						Total Quantity in sqm	**3.280**
1.024	9.48.2						
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc						
	window grill						
	window- LS qty 10kg/m2	1*3	1.500	0.500		10.000000	22.500
	ventilator- LS qty 10kg/m2	1*4	0.900	0.600		10.000000	21.600
	Total						**44.100**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in kg	**44.100**
1.025	9.53						
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	Iron holdfast						
	Door - D	6.000					6.000
	Window	4.000					4.000
	Total						**10.000**
						Total Quantity in each	**10.000**
1.026	9.117.2						
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 42x50 mm						
	uPVC Door frame						
	Toilet	4*1	5.000				20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
1.027	9.118.1						
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).						
	uPVC Door shutter						
	Door	4*1	0.800		2.100		6.720
	Total						**6.720**
						Total Quantity in sqm	**6.720**
1.028	50.9.15.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying and fixing 200 mm Aluminium aldrop						
	Aldrop						
	Door	5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
1.029	9.63.3						
	Providing and fixing ISI marked oxidised M.S. tower bolt black finish, (Barrel type) with necessary screws etc. complete:150x10 mm						
	Tower bolt						
	Door	5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
1.030	14.35.3						
	Providing and fixing finished brass hard drawn hooks and eyes:200 mm						
	Hooks and Eyes 200mm						
	window stay	6.000					6.000
	ventilator	8.000					8.000
	Total						**14.000**
						Total Quantity in no	**14.000**
1.031	14.35.5						
	Providing and fixing finished brass hard drawn hooks and eyes:100 mm						
	Hooks and Eyes 100mm						
	window shutter	3.000					3.000
	ventilator	8.000					8.000
	Total						**11.000**
						Total Quantity in no	**11.000**
1.032	9.66.1						
	Providing and fixing ISI marked oxidised M.S. handles conforming to IS : 4992 with necessary screws etc. complete:125 mm						
	MS handle						
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.033	13.85.1						
	Applying priming coats with primer of approved brand and manufacture, having low VOC (Volatile Organic Compound) content.With ready mixed pink or grey primer on wood work (hard and soft wood) having VOC content less than 50 grams/ litre						
	priming coat on wood work						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Door	1.000	1.000		2.100	2.600000	5.460
	Window	1.000	1.500		1.500	1.600000	3.600
	Ventilator	4.000	0.900		0.600	1.600000	3.456
	Total						**12.516**
						Total Quantity in sqm	**12.516**
1.034	13.61.1						
	Painting with synthetic enamel paint of approved brand and manufacture to give an even shade:Two or more coats on new work						
	Enamel paint						
	Door	1.000	1.000		2.100	1.125000	2.363
	Window	1.000	1.500		1.500	0.500000	1.125
	Ventilator	4.000	0.900		0.600	0.500000	1.080
	Collapsible steel shutter	1.000	1.500		3.000	1.500000	6.750
	Total						**11.318**
						Total Quantity in sqm	**11.318**
1.035	13.52.1						
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work						
	Epoxy paint						
	Window	1.000	1.500		1.500	0.500000	1.125
	Ventilator	4.000	0.900		0.600	0.500000	1.080
	Courtyard	1.000	1.900		1.500	1.000000	2.850
		1.000	1.700		1.500	1.000000	2.550
	Door	1.000	1.500		2.100	1.000000	3.150
	Counter Room	1.000	2.900		1.100	1.000000	3.190
	Total						**13.945**
						Total Quantity in sqm	**13.945**
1.036	17.3.2						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.c. pan with ISI marked black solid plastic seat and lid						
	European type						
		4.000					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**
1.037	50.17.1.4						
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.						
	CP Health faucet						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.038	17.4.1						
	Providing and fixing white vitreous china flat back or wall corner type lipped front urinal basin of 430x260x350 mm and 340x410x265 mm sizes respectively with automatic flushing cistern with standard flush pipe and C.P. brass spreaders with brass unions and G.I. clamps complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required:One urinal basin with 5 litre white P.V.C. automatic flushing cistern						
	Urinal basin						
		4.000					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**
1.039	17.7.2						
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 630 x 450 mm with a single 15 mm C.P. brass pillar tap						
	Wash basin						
		6.000					6.000
	Total						**6.000**
						Total Quantity in each	**6.000**
1.040	18.48						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.						
	Tank						
		3000.000					3000.000
	Total						**3000.000**
						Total Quantity in Litre	**3000.000**
1.041	50.18.9.9.2						
	Providing and fixing PVC pipes includes joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in CHarge. 110 mm dia 4 Kg/cm2						
	pvc pipes						
		50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.042	50.18.9.7.2						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge.63 mm dia 4 Kgf/cm2						
	PVC Pipe 63mm						
		50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.043	50.18.7.4.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 10Kgf/cm2- Internal work - Exposed on wall						
	PVC PIPE 32MM						
		150.000					150.000
	Total						**150.000**
						Total Quantity in metre	**150.000**
1.044	50.18.8.3.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 25 mm pipe 10kgf /cm2						
	PVC PIPE 25MM						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		150.000					150.000
	Total						**150.000**
						Total Quantity in metre	**150.000**
1.045	50.18.9.20.3						
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 63 mm dia Door Elbow						
	Door Elbow						
		6.000					6.000
	Total						**6.000**
						Total Quantity in no	**6.000**
1.046	50.18.9.22.3						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement-110 mm dia Door Elbow						
	Door Elbow 110mm						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.047	50.18.9.22.4						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement- 110 mm dia Bend						
	110 mm Dia Bend						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.048	50.18.9.22.6						
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 110x110x110 mm dia Door tee						
	Door Tee						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.049	50.17.1.1						
	Supplying and fixing Stainless steel soap dish including cost of materials and labour charges etc complete as per the direction of site Engineer-in-charge.						
	Soap Dish						
		10.000					10.000
	Total						**10.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in no	**10.000**
1.050	50.17.1.3						
	Supplying and fixing CP Towel rod 60cm or nearest available length including cost of materials and labour charges etc complete as per the direction of site Engineer-in-charge.						
	Towel Rod						
		6.000					6.000
	Total						**6.000**
						Total Quantity in no	**6.000**
1.051	50.18.9.21.7						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Vent cowl						
	Vent cowl						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.052	18.58.1.1						
	Providing and fixing PTMT grating of approved quality and colour. Circular type100 mm nominal dia						
	PTMT grating						
		10.000					10.000
	Total						**10.000**
						Total Quantity in each	**10.000**
1.053	19.4.1.1						
	Providing and fixing square-mouth S.W. gully trap class SP -1 complete with C.I. grating brick masonry chamber with water tight C.I. cover with frame of 300x300 mm size (inside) the weight of cover to be not less than 4.50 kg and frame to be not less than 2.70 kg as per standard design: 100x100 mm size P typeWith common burnt clay F.P.S. (non modular) bricks of class designation 7.5						
	Gully Trap						
		4.000					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**
1.054	18.18.2						
	Providing and fixing ball valve (brass) of approved quality, High or low pressure, with plastic floats complete:20 mm nominal bore						
	Ball valve						
		5.000					5.000
	Total						**5.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in each	**5.000**
1.055	18.51.1						
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore						
	Long body bib cock						
		20.000					20.000
	Total						**20.000**
						Total Quantity in each	**20.000**
1.056	17.31						
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.						
	Mirror						
		2.000					2.000
	Total						**2.000**
						Total Quantity in each	**2.000**
1.057	10.3						
	Providing and fixing in position collapsible steel shutters with vertical channels 20x10x2 mm and braced with flat iron diagonals 20x5 mm size, with top and bottom rail of T-iron 40x40x6 mm, with 40 mm dia steel pulleys, complete with bolts, nuts,locking arrangement, stoppers, handles, including applying a priming coat of approved steel primer .						
	Collapsible steel shutter						
		1.000	1.500		3.000		4.500
	Total						**4.500**
						Total Quantity in sqm	**4.500**
1.058	19.7.1.2						
	Constructing brick masonry manhole in cement mortar 1:4 (1 cement : 4 coarse sand) with R.C.C. top with 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size), foundation concrete 1:4:8 mix (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size,) inside plastering 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with floating coat of neat cement and making channels in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement complete as per standard design: Inside size 90x80 cm and 45 cm deep including C.I. cover with frame (light duty) 455x610 mm internal dimensions, total weight of cover and frame to be not less than 38 kg (weigh of cover 23 kg and weight of frame 15 kg):With Sewer bricks conforming to IS : 4885						
	manhole						
	manhole	1.000					1.000
	Total						**1.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in each	**1.000**
1.059	19.33						
	Constructing soak pit 1.20x1.20 m filled with brickbats including S.W. drain pipe 100 mm diameter and 1.20 m long complete as per standard design.						
	soak pit						
	soak pit	3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.060	19.15.1						
	Providing M.S. foot rests including fixing in manholes with 20x20x10 cm cement concrete blocks 1:3:6 (1 cement : 3 coarse sand: 6 graded stone aggregate 20 mm nominal size) as per standard design.With 20x20 mm square bar						
	Foot rest						
	for manhole	1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
1.061	10.2						
	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.						
	steel work						
	Courtyard LS Qty 10kg/m2	1.000	1.900		1.500	10.000 000	28.500
	LS Qty 10kg/m2	1.000	1.700		1.500	10.000 000	25.500
	Door LS Qty 10kg/m2	1.000	1.500		2.100	10.000 000	31.500
	Counter Room LS Qty 10kg/m2	1.000	2.900		1.100	10.000 000	31.900
	Total						**117.400**
						Total Quantity in kg	**117.400**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District-Construction of Approach Road to Fishing Harbour-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Approach road**			
1.001	3.15			
	Scarifying the existing bituminous road surface to a depth of 50 mm and disposal of scarified material with in all lifts and lead upto 1000 metres by Mechanical Means			
	Net Total	3135.000sqm	@5.55/sqm	17399.25
1.002	2.2			
	Clearing grass and removal of rubbish up to a distance of 50 metres outside the periphery of the area			
	Net Total	0.095Hectare	@46902.97/Hectare	4455.78
1.003	2.1.1			
	Cutting of trees, including cutting of trunks, branches and removal of stumps, roots, stacking of serviceable material with all lifts and up to a lead of 1000 metres and earth filling in the depression/pit. Girth from 300 mm to 600 mm			
	Net Total	30.000each	@603.02/each	18090.60
1.004	4.1.A.2			
	Construction of granular sub-base by providing graded Material, mixing in a mechanical mix plant at OMC, carriage of mixed Material to work site, spreading in uniform layers with a motor grader on the prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per clause 401 Grading-II - Plant Mix Method			
	Net Total	826.500cum	@3280.48/cum	2711316.72
1.005	4.12			
	Providing, laying, spreading and compacting graded stone aggregate to Wet Mix Macadam specification including premixing the Material with water at OMC in mechanical mix plant carriage of mixed Material by tipper to site, laying in uniform layers with paver in sub- base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density.			
	Net Total	826.500cum	@3183.84/cum	2631443.76
1.006	5.1.a			
	Providing and applying primer coat with bitumen emulsion (SS) on prepared surface of granular Base including clearing of road surface and spraying primer at the rate of 0.70 - 1.0 kg/sqm using mechanical means.			
	Net Total	5225.000sqm	@57.98/sqm	302945.50
1.007	5.2.b			
	Providing and applying tack coat with bitumen emulsion (RS) using emulsion			

Sl No	Specification	Quantity	Rate	Amount
	pressure distributor at the rate of 0.25 - 0.30 kg per sqm on the prepared Granular Surface cleaned with mechanical broom.			
	Net Total	5225.000sqm	@13.05/sqm	68186.25
1.008	5.3.2.a			
	Providing and laying bituminous macadam with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading premixed with a bituminous binder (VG 30), transported to the site, laid over a previously prepared surface with paver finisher to the required grade, level, and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction For Grading II - (19 mm nominal size)			
	Net Total	261.250cum	@7787.76/cum	2034552.30
1.009	5.2.a			
	Providing and applying tack coat with bitumen emulsion(RS) using emulsion pressure distributor at the rate of 0.20 - 0.30 kg per sqm on the prepared bituminous surface cleaned with mechanical broom.			
	Net Total	5225.000sqm	@10.79/sqm	56377.75
1.010	5.6.2.a			
	Providing and laying bituminous concrete with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with a bituminous binder(NRMB) @ 5.4 percent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level, and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 507 complete in all respects For Grading - II (13.2 mm Nominal Size)			
	Net Total	156.750cum	@12465.77/cum	1954009.45
1.011	8.13			
	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads on Bituminous Surface @ 250 gms per sqm area, the thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35. The finished surface to be level, uniform, and free from streaks and holes.			
	Net Total	300.000sqm	@494.43/sqm	148329.00
1.012	8.35			
	Providing and fixing reflective road studs (Raised Pavement Marker) of ' category A' made out of ASA/HIPS/ABS moulded body with shanks and conforming to ASTM D 4280, strong enough to support a load of more than 13.635 T when tested in accordance with ASTM D 4280, reflective panel confirming to ASTM D 788, and reflectivity conforming to clause 804.4. including installation, drilling, fixing with adhesive etc. with 2 years warranty for the road stud as well as for in field performance as per clause 804.7.3 Road Markers/Road Stud with Lense Reflector :-			
	Net Total	720.000no	@195.85/no	141012.00
			Heading Total(Rs)	10088118.36
			Total Estimation PAC	

Sl No	Specification	Quantity	Rate	Amount
				10088118.36
Sl No	**Description**		**Percentage/LS**	**Amount**
2	**Lumsum Heading**			
2.001	Charges for Utility shifting - KSEB			
		0.00	0.00%	300000.00
2.002	Cost of Land Acquisition			
		0.00	0.00%	1000000.00
2.003	LS provision for part TS			
		0.00	0.00%	570000.00
			Total Lumsum Amount	1870000.00
3	**Extra Charges**			
2.001	Provision for GST			
		10088118.36	18.00%	1815861.30
			Grand Total	13773979.66
			Round off	26020.34
			Rounded Total(Rs)	13800000.00
	Rupees One Crore Thirty Eight Lakh			

ePRICE
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DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District-Construction of Approach Road to Fishing Harbour-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Approach road						
1.001	3.15						
	Scarifying the existing bituminous road surface to a depth of 50 mm and disposal of scarified material with in all lifts and lead upto 1000 metres by Mechanical Means						
	Existing village road 950m						
		1.000	950.000	3.300			3135.000
	Total						**3135.000**
						Total Quantity in sqm	**3135.000**
1.002	2.2						
	Clearing grass and removal of rubbish up to a distance of 50 metres outside the periphery of the area						
	for Approach Road						
		1.000	950.000	1.000		0.000100	0.095
	Total						**0.095**
						Total Quantity in Hectare	**0.095**
1.003	2.1.1						
	Cutting of trees, including cutting of trunks, branches and removal of stumps, roots, stacking of serviceable material with all lifts and up to a lead of 1000 metres and earth filling in the depression/pit. Girth from 300 mm to 600 mm						
	coconut trees						
		30.000					30.000
	Total						**30.000**
						Total Quantity in each	**30.000**
1.004	4.1.A.2						
	Construction of granular sub-base by providing graded Material, mixing in a mechanical mix plant at OMC, carriage of mixed Material to work site, spreading in uniform layers with a motor grader on the prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per clause 401 Grading-II - Plant Mix Method						
	Approach road						
		1.000	950.000	5.800	0.150		826.500
	Total						**826.500**
						Total Quantity in cum	**826.500**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.005	4.12						
	Providing, laying, spreading and compacting graded stone aggregate to Wet Mix Macadam specification including premixing the Material with water at OMC in mechanical mix plant carriage of mixed Material by tipper to site, laying in uniform layers with paver in sub- base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density.						
	for Approach Road						
		1.000	950.000	5.800	0.150		826.500
	Total						**826.500**
						Total Quantity in cum	**826.500**
1.006	5.1.a						
	Providing and applying primer coat with bitumen emulsion (SS) on prepared surface of granular Base including clearing of road surface and spraying primer at the rate of 0.70 - 1.0 kg/sqm using mechanical means.						
	for Approach Road						
		1.000	950.000	5.500			5225.000
	Total						**5225.000**
						Total Quantity in sqm	**5225.000**
1.007	5.2.b						
	Providing and applying tack coat with bitumen emulsion (RS) using emulsion pressure distributor at the rate of 0.25 - 0.30 kg per sqm on the prepared Granular Surface cleaned with mechanical broom.						
	for Approach Road						
		1.000	950.000	5.500			5225.000
	Total						**5225.000**
						Total Quantity in sqm	**5225.000**
1.008	5.3.2.a						
	Providing and laying bituminous macadam with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading premixed with a bituminous binder (VG 30), transported to the site, laid over a previously prepared surface with paver finisher to the required grade, level, and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction For Grading II - (19 mm nominal size)						
	for Approach Road-BM						
		1.000	950.000	5.500	0.050		261.250
	Total						**261.250**
						Total Quantity in cum	**261.250**
1.009	5.2.a						
	Providing and applying tack coat with bitumen emulsion(RS) using emulsion pressure distributor at the rate of 0.20 - 0.30 kg per sqm on the prepared bituminous surface cleaned with mechanical broom.						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for Approach Road						
		1.000	950.000	5.500			5225.000
	Total						**5225.000**
						Total Quantity in sqm	**5225.000**
1.010	5.6.2.a						
	Providing and laying bituminous concrete with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with a bituminous binder(NRMB) @ 5.4 percent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level, and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 507 complete in all respects For Grading - II (13.2 mm Nominal Size)						
	for Approach Road-BC						
		1.000	950.000	5.500	0.030		156.750
	Total						**156.750**
						Total Quantity in cum	**156.750**
1.011	8.13						
	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads on Bituminous Surface @ 250 gms per sqm area, the thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35. The finished surface to be level, uniform, and free from streaks and holes.						
	for Approach Road						
	ch0-950	2.000	950.000	0.150			285.000
	zebra crossing	10.000	2.500	0.500			12.500
	Rounding	1.000			2.500		2.500
	Total						**300.000**
						Total Quantity in sqm	**300.000**
1.012	8.35						
	Providing and fixing reflective road studs (Raised Pavement Marker) of ' category A' made out of ASA/HIPS/ABS moulded body with shanks and conforming to ASTM D 4280, strong enough to support a load of more than 13.635 T when tested in accordance with ASTM D 4280, reflective panel confirming to ASTM D 788, and reflectivity conforming to clause 804.4. including installation, drilling, fixing with adhesive etc. with 2 years warranty for the road stud as well as for in field performance as per clause 804.7.3 Road Markers/Road Stud with Lense Reflector :-						
	for Approach Road						
	both side	2.000	300.000				600.000
	for zebra crossing	10*12					120.000
	Total						**720.000**
						Total Quantity in no	**720.000**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasargod District- Construction of Work shop Building-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Civil work**			
1.001	2.8.1			
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil			
	Net Total	188.111cum	@291.42/cum	54819.31
1.002	50.2.3.1			
	Pumping or Bailing out water and removing slush etc by using pump set including cost of labour, oil hire charges of pumpset, etc complete			
	Net Total	50.000hour	@279.29/hour	13964.50
1.003	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	21.828cum	@6687.21/cum	145968.42
1.004	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	23.184cum	@7069.78/cum	163905.78
1.005	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	52.077cum	@9237.20/cum	481045.66
1.006	5.34.1			
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30			

Sl No	Specification	Quantity	Rate	Amount
	grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	85.538cum	@80.55/cum	6890.09
1.007	50.2.25.1			
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge			
	Net Total	28.981cum	@515.98/cum	14953.62
1.008	4.1.6			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)			
	Net Total	8.280cum	@7076.05/cum	58589.69
1.009	60.7.2			
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.			
	Net Total	4.969cum	@2557.65/cum	12708.96
1.010	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	33.461cum	@10858.36/cum	363331.58
1.011	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	145.100sqm	@329.03/sqm	47742.25
1.012	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	148.924sqm	@800.47/sqm	119209.19
1.013	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	145.770sqm	@637.63/sqm	92947.33

Sl No	Specification	Quantity	Rate	Amount
1.014	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	99.400sqm	@847.44/sqm	84235.54
1.015	OD5543/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR			
	Net Total	7013.440kilogram	@96.62/kilogram	677638.57
1.016	50.6.7.2			
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.			
	Net Total	68.406cum	@7872.96/cum	538557.70
1.017	21.1.1.1			
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)			
	Net Total	165.600kg	@489.70/kg	81094.32
1.018	21.3.2			
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 5.50 mm thickness			
	Net Total	12.640sqm	@1497.40/sqm	18927.14
1.019	9.116			
	Providing and fixing sliding arrangement in racks/ cupboards/cabinets shutter by with stainless steel rollers to run inside C or E aluminium channel section (The payment of C or E channel shall be made separately			
	Net Total	36.000no	@17.12/no	616.32
1.020	9.117.1			
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets			

Sl No	Specification	Quantity	Rate	Amount
	and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 48x40 mm			
	Net Total	15.600metre	@256.03/metre	3994.07
1.021	9.118.1			
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).			
	Net Total	5.400sqm	@2033.68/sqm	10981.87
1.022	9.53			
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	56.000each	@207.00/each	11592.00
1.023	9.97.5			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:100x10 mm			
	Net Total	3.000no	@67.14/no	201.42
1.024	50.9.15.1			
	Supplying and fixing 200 mm Aluminium aldrop			
	Net Total	3.000no	@171.51/no	514.53
1.025	10.6.1			
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	32.560sqm	@3400.57/sqm	110722.56
1.026	10.2			
	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.			
	Net Total	34.440kg	@117.55/kg	4048.42
1.027	50.18.9.22.8			
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement -110 mm dia Vent cowl			
	Net Total	1.000no	@123.09/no	123.09
1.028	50.18.7.4.2			
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall			
	Net Total	50.000metre	@295.71/metre	14785.50
1.029	50.18.7.6.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 10 Kfg/cm - Internal work- Exposed on wall			
	Net Total	40.000metre	@409.92/metre	16396.80
1.030	50.18.9.4.2			
	Providing and fixing PVC pipes includings joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 32 mm dia 6 Kgf/cm2			
	Net Total	40.000metre	@218.52/metre	8740.80
1.031	50.18.9.9.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2			
	Net Total	40.000metre	@521.14/metre	20845.60
1.032	50.18.9.13.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 25 mm dia 10 Kgf/cm2- External work - Exposed on wall			
	Net Total	50.000metre	@271.93/metre	13596.50
1.033	50.18.9.14.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm			

Sl No	Specification	Quantity	Rate	Amount
	dia 6 Kgf/cm2 - External work - Exposed on wall			
	Net Total	50.000metre	@305.29/metre	15264.50
1.034	50.18.9.18.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall			
	Net Total	50.000metre	@279.39/metre	13969.50
1.035	50.18.9.19.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/ clips/ at 1.00 m spacing . This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 mm dia 6 Kgf/cm2 - External work- Exposed on wall			
	Net Total	40.000metre	@379.40/metre	15176.00
1.036	13.1.1			
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	687.425sqm	@308.22/sqm	211878.13
1.037	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	82.800sqm	@262.57/sqm	21740.80
1.038	11.36			
	Providing and fixing I st quality ceramic glazed wall tiles conforming to IS : 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer -in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3 kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.			
	Net Total	8.150sqm	@1190.03/sqm	9698.74
1.039	11.41.2			
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.			
	Net Total	95.220sqm	@1733.20/sqm	165035.30
1.040	13.48.1			
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm			
	Net Total	762.075sqm	@164.22/sqm	125147.96
1.041	13.52.1			

Sl No	Specification	Quantity	Rate	Amount
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work			
	Net Total	106.072sqm	@219.17/sqm	23247.80
1.042	17.3.1			
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.C. pan with ISI marked white solid plastic seat and lid			
	Net Total	1.000each	@7721.48/each	7721.48
1.043	50.17.1.4			
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.			
	Net Total	1.000no	@758.07/no	758.07
1.044	17.7.3			
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 550x400 mm with a pair of 15 mm C.P. brass pillar taps			
	Net Total	3.000each	@3288.29/each	9864.87
1.045	18.51.1			
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore			
	Net Total	4.000each	@637.96/each	2551.84
1.046	18.52.1			
	Providing and fixing C.P brass stop cock (concealed) of standard design and of approved make conforming to IS: 893115 mm nominal bore			
	Net Total	5.000each	@700.27/each	3501.35
1.047	17.73.1			
	Providing and fixing PTMT towel rail complete with brackets fixed to wooden cleats with CP brass screws with concealed fitting arrangement of approved quality and colour450 mm long towel rail with total length of 495 mm, 78 mm wide and effective height of 88 mm. weighing not less than 170 gms			
	Net Total	2.000no	@641.43/no	1282.86
1.048	17.74			
	Providing and fixing PTMT shelf 440 mm long, 124 mm width and 36 mm height of approved quality and colour, weighing not less than 300 gms.			
	Net Total	1.000no	@741.89/no	741.89
1.049	18.65			

Sl No	Specification	Quantity	Rate	Amount
	Providing and fixing PTMT Soap Dish Holder having length of 138 mm, breadth 102 mm, height of 75 mm with concealed fittings arrangements, weighing not less than 106 gms.			
	Net Total	1.000each	@150.72/each	150.72
1.050	17.71			
	Providing and fixing PTMT liquid soap container 109 mm wide, 125 mm high and 112 mm distance from wall of standard shape with bracket of the same materials with snap fittings of approved quality and colour, weighing not less than 105 gms			
	Net Total	2.000each	@183.17/each	366.34
1.051	17.31			
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.			
	Net Total	1.000each	@1481.95/each	1481.95
1.052	18.48			
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.			
	Net Total	1000.000Litre	@10.18/Litre	10180.00
			Heading Total(Rs)	3833449.23
			Total Estimation PAC	3833449.23
Sl No	**Description**		**Percentage/LS**	**Amount**
2	**Lumsum Heading**			
2.001	LS Amount for Electrification			
		0.00	0.00%	150000.00
			Total Lumsum Amount	150000.00
3	**Extra Charges**			
2.001	Provision for GST			
		3833449.23	18.00%	690020.86
			Grand Total	4673470.09
			Round off	6529.91
			Rounded Total(Rs)	4680000.00
	Rupees Forty Six Lakh Eighty Thousand			

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasargod District- Construction of Work shop Building-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Civil work						
1.001	2.8.1						
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil						
	Earthwork						
	Footing 2.0x2.0	16.000	2.200	2.200	1.550		120.032
	Outer wall	2.000	10.050	0.800	0.750		12.060
		2.000	9.400	0.800	0.750		11.280
	Cross wall-rooms	2.000	6.000	0.800	0.750		7.200
		5.000	2.700	0.800	0.750		8.100
	Ramp	2.000	6.000	2.900	0.150		5.220
	Septic Tank	1.000	6.000	2.500	1.500		22.500
	Soak pit	1.000	1.250	1.250	1.100		1.719
	Total						**188.111**
						Total Quantity in cum	**188.111**
1.002	50.2.3.1						
	Pumping or Bailing out water and removing slush etc by using pump set including cost of labour, oil hire charges of pumpset, etc complete						
	Pumping						
	For footing	50.000					50.000
	Total						**50.000**
						Total Quantity in hour	**50.000**
1.003	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	PCC						
	Footing 2.0x2.0	16.000	2.200	2.200	0.150		11.616
	Outer wall	2.000	10.050	0.800	0.150		2.412
		2.000	9.400	0.800	0.150		2.256
	Cross wall-rooms	2.000	6.000	0.800	0.150		1.440

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		5.000	2.700	0.800	0.150		1.620
	Septic Tank	1.000	6.000	2.500	0.150		2.250
	Soak pit	1.000	1.250	1.250	0.150		0.234
	Total						**21.828**
						Total Quantity in cum	**21.828**
1.004	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	RR masonry						
	Outer wall	2.000	10.050	0.600	0.600		7.236
		2.000	9.400	0.600	0.600		6.768
	Cross wall-rooms	2.000	6.000	0.600	0.600		4.320
		5.000	2.700	0.600	0.600		4.860
	Total						**23.184**
						Total Quantity in cum	**23.184**
1.005	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	RCC- upto plinth level						
	Footing	16.000	2.000	2.000	0.200		12.800
		16.000	1/3	(2*2)+(0.5*0.5)+(2*0.5)	0.200		5.600
	Footing pedestal	0.950	0.500	0.500	1.000		0.238
	Plinth beam	2.000	10.050	0.450	0.450		4.070
	Short wall	2.000	9.400	0.450	0.450		3.807
	Cross wall-rooms	2.000	6.000	0.450	0.450		2.430
		5.000	2.700	0.450	0.450		2.734
	Ramp	2.000	6.000	2.900	(0.60+0.15)/2		13.050
	Soak pit	1.000	4*1.25	0.200	1.000		1.000
	Septic Tank -bed slab	1.000	6.000	2.500	0.150		2.250

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Septic Tank -side wall	2.000	2.100	0.200	1.100		0.924
	Septic Tank -side wall	2.000	0.600	0.200	1.100		0.264
	Septic Tank - baffle wall	2.000	2.100	0.150	0.800		0.504
	Septic Tank - cover slab	1.000	6.000	2.500	0.150		2.250
	Soak pit -cover slab	1.000	1.250	1.250	0.100		0.156
	Total						**52.077**
						Total Quantity in cum	**52.077**
1.006	5.34.1						
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	RCC- upto plinth level						
	Footing	16.000	2.000	2.000	0.200		12.800
		16.000	1/3	(2*2)+(0.5*0.5)+(2*0.5)	0.200		5.600
	Footing pedestal	0.950	0.500	0.500	1.000		0.238
	Plinth beam	2.000	10.050	0.450	0.450		4.070
	Short wall	2.000	9.400	0.450	0.450		3.807
	Cross wall-rooms	2.000	6.000	0.450	0.450		2.430
		5.000	2.700	0.450	0.450		2.734
	Ramp	2.000	6.000	2.900	(0.60+0.15)/2		13.050
	Soak pit	1.000	4*1.25	0.200	1.000		1.000
	Septic Tank -bed slab	1.000	6.000	2.500	0.150		2.250
	Septic Tank -side wall	2.000	2.100	0.200	1.100		0.924
	Septic Tank -side wall	2.000	0.600	0.200	1.100		0.264
	Septic Tank - baffle wall	2.000	2.100	0.150	0.800		0.504
	Septic Tank - cover slab	1.000	6.000	2.500	0.150		2.250
	Soak pit -cover slab	1.000	1.250	1.250	0.100		0.156
	Total						**52.077**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Lintel						
	Outer wall	4.000	9.800	0.200	0.150		1.176
	Cross wall-rooms	2.000	6.000	0.200	0.150		0.360
		5.000	2.700	0.200	0.150		0.405
	Total						**1.941**
	Beam						
	longitudinal	12.000	2.900	0.300	0.350		3.654
	transverse	12.000	2.800	0.300	0.350		3.528
	Total						**7.182**
	Roof slab						
	Roof slab	1.000	10.400	10.400	0.120		12.979
	Deduct crane room	-1.000	3.000	3.000	0.120		-1.080
	crane room slab	1.000	4.000	4.000	0.120		1.920
	Total						**13.819**
	Sunshade						
	Outer wall	4.000	9.800	0.600	(0.1+0.07)/2		1.999
	Total						**1.999**
	Columns						
	Columns	12.000	0.300	0.400	4.100		5.904
	Columns for crane room	4.000	0.300	0.400	5.450		2.616
	Total						**8.520**
						Total Quantity in cum	**85.538**
1.007	50.2.25.1						
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge						
	Filling						
	shop & workshop rooms	3.000	3.000	3.000	0.350		9.450
	office room	1.000	1.750	3.000	0.350		1.838
	workspace	1.000	3.000	9.400	0.350		9.870
	toilet	1.000	1.050	1.200	0.350		0.441
	passage+ crane facility	1.000	6.400	3.000	0.350		6.720
	passage to w/c	1.000	1.050	1.800	0.350		0.662
	Total						**28.981**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**28.981**
1.008	4.1.6						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)						
	CC Flooring						
	shop & workshop rooms	3.000	3.000	3.000	0.100		2.700
	office room	1.000	1.750	3.000	0.100		0.525
	workspace	1.000	3.000	9.400	0.100		2.820
	toilet	1.000	1.050	1.200	0.100		0.126
	passage+ crane facility	1.000	6.400	3.000	0.100		1.920
	passage to w/c	1.000	1.050	1.800	0.100		0.189
	Total						**8.280**
						Total Quantity in cum	**8.280**
1.009	60.7.2						
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.						
	DR packing						
	Septic tank	1.000	6.000	2.500	0.300		4.500
	Soak pit	1.000	1.250	1.250	0.300		0.469
	Total						**4.969**
						Total Quantity in cum	**4.969**
1.010	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	Lintel						
	Outer wall	4.000	9.800	0.200	0.150		1.176
	Cross wall-rooms	2.000	6.000	0.200	0.150		0.360
		5.000	2.700	0.200	0.150		0.405
	Total						**1.941**
	Beam						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	longitudinal	12.000	2.900	0.300	0.350		3.654
	transverse	12.000	2.800	0.300	0.350		3.528
	Total						**7.182**
	Roof slab						
	Roof slab	1.000	10.400	10.400	0.120		12.979
	Deduct crane room	-1.000	3.000	3.000	0.120		-1.080
	crane room slab	1.000	4.000	4.000	0.120		1.920
	Total						**13.819**
	Sunshade						
	Outer wall	4.000	9.800	0.600	(0.1+0.07)/2		1.999
	Total						**1.999**
	Columns						
	Columns	12.000	0.300	0.400	4.100		5.904
	Columns for crane room	4.000	0.300	0.400	5.450		2.616
	Total						**8.520**
						Total Quantity in cum	**33.461**
1.011	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	Footing & foundations						
	Footing PCC	4*16	2.200		0.150		21.120
	Footing RCC	4*16	2.000		0.200		25.600
	Pedestal	4*16	0.500		1.000		32.000
	Septic Tank-bed slab	1.000	6+2.5		0.150		1.275
	Soak pit-bed slab	1.000	1.250+1.250		0.150		0.375
	Septic Tank -side wall	2*2	2.1+6		1.100		35.640
	Septic Tank - baffle wall	2*2	2.100		0.800		6.720
	Septic Tank - cover slab	2.000	6+2.5		0.150		2.550
	Soak pit -cover slab	4.000	1.250		0.100		0.500
	Outer wall	2*2.000	10.050		0.150		6.030

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		2*2.000	9.400		0.150		5.640
	Cross wall-rooms	2*2.000	6.000		0.150		3.600
		2*5.000	2.700		0.150		4.050
	Total						**145.100**
						Total Quantity in sqm	**145.100**
1.012	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Slabs						
	Roof slab	1.000	10.400	10.400			108.160
		4.000	10.400		0.120		4.992
	Deduct crane room	-1.000	3.000	3.000			-9.000
	crane room slab	1.000	4.000	4.000			16.000
		4.000	4.000		0.120		1.920
	Total						**122.072**
	Sunshade						
	sunshade	4.000	9.800	0.600			23.520
		4.000	9.800		(0.1+0.07)/2		3.332
	Total						**26.852**
						Total Quantity in sqm	**148.924**
1.013	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	Plinth beam						
	Outer wall	2*2.000	10.050		0.450		18.090
		2*2.000	9.400		0.450		16.920
	Cross wall-rooms	2*2.000	6.000		0.450		10.800
		2*5.000	2.700		0.450		12.150
	Total						**57.960**
	Lintel						
	Outer wall	2*4.000	9.800		0.150		11.760

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Cross wall-rooms	2*2.000	6.000		0.150		3.600
		2*5.000	2.700		0.150		4.050
	Total						**19.410**
	Beams						
	longitudinal	12.000	2.900	0.300			10.440
	longitudinal	2*12.000	2.900		0.350		24.360
	transverse	12.000	2.800	0.300			10.080
	transverse	2*12.000	2.800		0.350		23.520
	Total						**68.400**
						Total Quantity in sqm	**145.770**
1.014	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	Columns						
	Columns	12.000	(0.300+0.4)*2		4.100		68.880
	Columns for crane room	4.000	(0.300+0.4)*2		5.450		30.520
	Total						**99.400**
						Total Quantity in sqm	**99.400**
1.015	OD5543/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR						
	Steel						
	LS Qty-80kg/m3 For item no.5	52.077				80.000000	4166.160
	For item no.10	8.520				100.000000	852.000
	For item no.10	24.941				80.000000	1995.280
	Total						**7013.440**
						Total Quantity in kilogram	**7013.440**
1.016	50.6.7.2						
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.						
	Laterite masonry						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Outer wall	2.000	10.050	0.200	4.100		16.482
		1.000	9.400	0.200	4.100		7.708
	Cross wall-rooms	2.000	6.000	0.200	4.100		9.840
		5.000	2.700	0.200	4.100		11.070
	additional height for crane room	1.000	9.000	0.200	5.45-4.100		2.430
	Parapet wall	4.000	10.100		0.800		32.320
	deductions- RS1	-2.000	1.500	0.200	3.700		-2.220
	deductions- RS2	-2.000	2.900	0.200	3.700		-4.292
	deductions- Door D	-2.000	1.100	0.200	2.100		-0.924
	deductions- Door D1	-1.000	0.800	0.200	2.100		-0.336
	deductions- Window W	-6.000	1.500	0.200	1.500		-2.700
	deductions- Window W1	-3.000	1.000	0.200	1.500		-0.900
	deductions- Ventilator V	-1.000	0.600	0.200	0.600		-0.072
	Total						**68.406**
						Total Quantity in cum	**68.406**
1.017	21.1.1.1						
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)						
	Aluminium window						
	Window frame, W	6.000	4*(1.5+.8)			2.000000	110.400
	Window frame, W1	3.000	4*(1.5+.6)			2.000000	50.400
	ventilator V	1.000	4*0.600			2.000000	4.800
	Total						**165.600**
						Total Quantity in kg	**165.600**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.018	21.3.2						
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 5.50 mm thickness						
	Glazing						
	Window W	2*6	1.300	0.600			9.360
	Window W1	2*3	1.300	0.400			3.120
	ventilator V	1.000	0.400	0.400			0.160
	Total						**12.640**
						Total Quantity in sqm	**12.640**
1.019	9.116						
	Providing and fixing sliding arrangement in racks/ cupboards/cabinets shutter by with stainless steel rollers to run inside C or E aluminium channel section (The payment of C or E channel shall be made separately						
	Sliding arrangement						
	Windows	4*9					36.000
	Total						**36.000**
						Total Quantity in no	**36.000**
1.020	9.117.1						
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 48x40 mm						
	frame						
	Door D	2*2	2.100				8.400
	Door D	1*2	1.100				2.200
	Door D1	2*1.000	2.100				4.200
	Door D1	1.000	0.800				0.800
	Total						**15.600**
						Total Quantity in metre	**15.600**
1.021	9.118.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).						
	Shutter						
	D	2.000	1.000		2.000		4.000
	D1	1.000	0.700		2.000		1.400
	Total						**5.400**
						Total Quantity in sqm	**5.400**
1.022	9.53						
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	Hold fast						
	Door	3*6				1.000000	18.000
	Window	9*4				1.000000	36.000
	V	1*2				1.000000	2.000
	Total						**56.000**
						Total Quantity in each	**56.000**
1.023	9.97.5						
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:100x10 mm						
	Tower bolt						
	Doors	3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.024	50.9.15.1						
	Supplying and fixing 200 mm Aluminium aldrop						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Aluminium aldrop						
	For doors	3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.025	10.6.1						
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover						
	Rolling shutter						
	RS1	2.000	1.500		3.700		11.100
	RS2	2.000	2.900		3.700		21.460
	Total						**32.560**
						Total Quantity in sqm	**32.560**
1.026	10.2						
	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.						
	Grill						
	LS Qty 10kg/m2	3.000	2.800		4.100		34.440
	Total						**34.440**
						Total Quantity in kg	**34.440**
1.027	50.18.9.22.8						
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement -110 mm dia Vent cowl						
	Vent cowl						
	For toilet	1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.028	50.18.7.4.2						
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall						
	PVC Pipe						
	32mm	50.000					50.000
	Total						**50.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in metre	**50.000**
1.029	50.18.7.6.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 10 Kfg/cm - Internal work- Exposed on wall						
	PVC Pipe						
	50mm	40.000					40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.030	50.18.9.4.2						
	Providing and fixing PVC pipes includings joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 32 mm dia 6 Kgf/cm2						
	PVC Pipe						
	32mm	40.000					40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.031	50.18.9.9.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2						
	PVC Pipe						
	110mm	40.000					40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.032	50.18.9.13.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 25 mm dia 10 Kgf/cm2- External work - Exposed on wall						
	PVC Pipe						
	25mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.033	50.18.9.14.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - External work - Exposed on wall						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	PVC Pipe						
	32mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.034	50.18.9.18.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall						
	PVC Pipe						
	75mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.035	50.18.9.19.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/ clips/ at 1.00 m spacing . This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 mm dia 6 Kgf/cm2 - External work- Exposed on wall						
	PVC Pipe						
	110mm	40.000					40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.036	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	Plastering						
	Outer wall	2*2.000	10.050		4.100		164.820
		2*1.000	9.400		4.100		77.080
	Cross wall-rooms	2*2.000	6.000		4.100		98.400
		2*5.000	2.700		4.100		110.700
	additional height for crane room	2*1.000	9.000		5.45-4.100		24.300
	Parapet wall	2*4.000	10.100		0.800+.8+.10		137.360
	Sunshade	2*4.000	9.800	0.600			47.040
	Plinth beam	2.000	10.050		0.450		9.045
		2.000	9.400		0.450		8.460

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	LS for beam and column projections	100.000					100.000
	deductions- RS1	-2*2.000	1.500		3.700		-22.200
	deductions- RS2	-2*2.000	2.900		3.700		-42.920
	deductions- Door D	-2.000	1.100		2.100		-4.620
	deductions- Door D1	-1.000	0.800		2.100		-1.680
	deductions- Window W	-6.000	1.500		1.500		-13.500
	deductions- Window W1	-3.000	1.000		1.500		-4.500
	deductions- Ventilator V	-1.000	0.600		0.600		-0.360
	Total						**687.425**
						Total Quantity in sqm	**687.425**
1.037	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	Ceiling plastering						
	shop & workshop rooms	3.000	3.000	3.000			27.000
	office room	1.000	1.750	3.000			5.250
	workspace	1.000	3.000	9.400			28.200
	toilet	1.000	1.050	1.200			1.260
	passage+ crane facility	1.000	6.400	3.000			19.200
	passage to w/c	1.000	1.050	1.800			1.890
	Total						**82.800**
						Total Quantity in sqm	**82.800**
1.038	11.36						
	Providing and fixing I st quality ceramic glazed wall tiles conforming to IS : 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer -in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3 kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.						
	Wall tiles						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	w/c	1.000	2*(1.05+ 1.2)		1.500		6.750
	Wash area	1.000	2.000		0.700		1.400
	Total						**8.150**
						Total Quantity in sqm	**8.150**
1.039	11.41.2						
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.						
	Floor Tile						
	shop & workshop rooms	3.000	3.000	3.000			27.000
	office room	1.000	1.750	3.000			5.250
	workspace	1.000	3.000	9.400			28.200
	toilet	1.000	1.050	1.200			1.260
	passage+ crane facility	1.000	6.400	3.000			19.200
	passage to w/c	1.000	1.050	1.800			1.890
	For Skirting - 15% of floor area	82.800				0.150000	12.420
	Total						**95.220**
						Total Quantity in sqm	**95.220**
1.040	13.48.1						
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm						
	Painting						
	ceiling- shop & workshop rooms	3.000	3.000	3.000			27.000
	office room	1.000	1.750	3.000			5.250
	workspace	1.000	3.000	9.400			28.200
	toilet	1.000	1.050	1.200			1.260
	passage+ crane facility	1.000	6.400	3.000			19.200
	passage to w/c	1.000	1.050	1.800			1.890
	Outer wall	2*2.000	10.050		4.100		164.820
		2*1.000	9.400		4.100		77.080

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Cross wall-rooms	2*2.000	6.000		4.100		98.400
		2*5.000	2.700		4.100		110.700
	additional height for crane room	2*1.000	9.000		5.45-4.100		24.300
	Parapet wall	2*4.000	10.100		0.800+.8+.10		137.360
	Sunshade	2*4.000	9.800	0.600			47.040
	Plinth beam	2.000	10.050		0.450		9.045
		2.000	9.400		0.450		8.460
	LS for beam and column projections	100.000					100.000
	deductions- RS1	-2*2.000	1.500		3.700		-22.200
	deductions- RS2	-2*2.000	2.900		3.700		-42.920
	deductions- Door D	-2.000	1.100		2.100		-4.620
	deductions- Door D1	-1.000	0.800		2.100		-1.680
	deductions- Window W	-6.000	1.500		1.500		-13.500
	deductions- Window W1	-3.000	1.000		1.500		-4.500
	deductions- Ventilator V	-1.000	0.600		0.600		-0.360
	deductions-wall tile w/c	-1.000	2*(1.05+1.2)		1.500		-6.750
	deductions-Wash area	-1.000	2.000		0.700		-1.400
	Total						**762.075**
						Total Quantity in sqm	**762.075**
1.041	13.52.1						
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work						
	Epoxy paint						
	RS1	2*2.000	1.500		3.700	1.100000	24.420

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	RS2	2*2.000	2.900		3.700	1.100000	47.212
	Grill	3.000	2.800		4.100	1.000000	34.440
	Total						**106.072**
						Total Quantity in sqm	**106.072**
1.042	17.3.1						
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.C. pan with ISI marked white solid plastic seat and lid						
	WC						
	Water Closet	1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
1.043	50.17.1.4						
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.						
	Health Faucet						
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.044	17.7.3						
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 550x400 mm with a pair of 15 mm C.P. brass pillar taps						
	Wash basin						
	Wash basin	3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.045	18.51.1						
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore						
	Bib cock						
	Bib cock	4.000					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.046	18.52.1						
	Providing and fixing C.P brass stop cock (concealed) of standard design and of approved make conforming to IS: 893115 mm nominal bore						
	Stop cock						
	For Health faucet and water closet	2.000					2.000
	For wash basin	3.000					3.000
	Total						**5.000**
						Total Quantity in each	**5.000**
1.047	17.73.1						
	Providing and fixing PTMT towel rail complete with brackets fixed to wooden cleats with CP brass screws with concealed fitting arrangement of approved quality and colour450 mm long towel rail with total length of 495 mm, 78 mm wide and effective height of 88 mm. weighing not less than 170 gms						
	Towel rail						
	For w/c & wash area	2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.048	17.74						
	Providing and fixing PTMT shelf 440 mm long, 124 mm width and 36 mm height of approved quality and colour, weighing not less than 300 gms.						
	PTMT Shelf						
	For Toilet	1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.049	18.65						
	Providing and fixing PTMT Soap Dish Holder having length of 138 mm, breadth 102 mm, height of 75 mm with concealed fittings arrangements, weighing not less than 106 gms.						
	Soap dish						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
1.050	17.71						
	Providing and fixing PTMT liquid soap container 109 mm wide, 125 mm high and 112 mm distance from wall of standard shape with bracket of the same materials with snap fittings of approved quality and colour, weighing not less than 105 gms						
	Fixing liquid soap container						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	liquid soap container	2.000					2.000
	Total						**2.000**
						Total Quantity in each	**2.000**
1.051	17.31						
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.						
	Fixing mirror						
	mirror	1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
1.052	18.48						
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.						
	Water tank						
	Water tank	1.000	1000.000				1000.000
	Total						**1000.000**
						Total Quantity in Litre	**1000.000**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of office room cum harbour surveillance camera room-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Civil work**			
1.001	2.8.1			
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil			
	Net Total	293.071cum	@291.42/cum	85406.75
1.002	50.2.3.1			
	Pumping or Bailing out water and removing slush etc by using pump set including cost of labour, oil hire charges of pumpset, etc complete			
	Net Total	50.000hour	@279.29/hour	13964.50
1.003	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	36.210cum	@6687.21/cum	242143.87
1.004	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	43.200cum	@7069.78/cum	305414.50
1.005	50.2.25.1			
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge			
	Net Total	118.566cum	@515.98/cum	61177.68
1.006	4.1.6			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)			
	Net Total	26.348cum	@7076.05/cum	186439.77
1.007	60.7.2			

Sl No	Specification	Quantity	Rate	Amount
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.			
	Net Total	4.969cum	@2557.65/cum	12708.96
1.008	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	71.603cum	@9237.20/cum	661411.23
1.009	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	90.338cum	@10858.36/cum	980922.53
1.010	5.34.1			
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	161.941cum	@80.55/cum	13044.35
1.011	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	235.330sqm	@329.03/sqm	77430.63
1.012	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	466.424sqm	@800.47/sqm	373358.42
1.013	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	342.073sqm	@637.63/sqm	218116.01

Sl No	Specification	Quantity	Rate	Amount
1.014	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	171.640sqm	@847.44/sqm	145454.60
1.015	5.9.7			
	Centering and shuttering including strutting, etc. and removal of form for:Stairs, (excluding landings) except spiral - staircases)			
	Net Total	5.445sqm	@718.82/sqm	3913.97
1.016	OD5511/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR			
	Net Total	12987.040kilogram	@96.62/kilogram	1254807.80
1.017	50.6.7.2			
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.			
	Net Total	89.888cum	@7872.96/cum	707684.63
1.018	21.1.1.1			
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)			
	Net Total	539.600kg	@489.70/kg	264242.12
1.019	21.2.2			
	Providing and fixing 12 mm thick prelaminated particle board flat pressed three layer or graded wood particle board conforming to IS : 12823 Grade I Type II, in panelling fixed in aluminum doors, windows shutters and partition frames with C.P. brass / stainless steel screws etc. complete as per architectural drawings and directions of Engineer - in- Charge.Pre- laminated particle board with decorative lamination on both sides			
	Net Total	5.400sqm	@1209.19/sqm	6529.63
1.020	21.3.2			
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of			

Sl No	Specification	Quantity	Rate	Amount
	aluminium snap beading shall be paid in basic item):With float glass panes of 5.50 mm thickness			
	Net Total	60.400sqm	@1497.40/sqm	90442.96
1.021	9.116			
	Providing and fixing sliding arrangement in racks/ cupboards/cabinets shutter by with stainless steel rollers to run inside C or E aluminium channel section (The payment of C or E channel shall be made separately			
	Net Total	48.000no	@17.12/no	821.76
1.022	9.117.1			
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 48x40 mm			
	Net Total	15.000metre	@256.03/metre	3840.45
1.023	9.118.1			
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).			
	Net Total	4.800sqm	@2033.68/sqm	9761.66
1.024	9.53			
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	96.000each	@207.00/each	19872.00
1.025	9.97.5			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:100x10 mm			
	Net Total	12.000no	@67.14/no	805.68

Sl No	Specification	Quantity	Rate	Amount
1.026	9.88			
	Providing and fixing chromium plated brass 100 mm mortice latch and lock with 6 levers and a pair of lever handles of approved quality with necessary screws etc. complete.			
	Net Total	7.000no	@931.47/no	6520.29
1.027	50.9.15.1			
	Supplying and fixing 200 mm Aluminium aldrop			
	Net Total	3.000no	@171.51/no	514.53
1.028	10.6.1			
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover			
	Net Total	23.385sqm	@3400.57/sqm	79522.33
1.029	50.18.9.22.8			
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement -110 mm dia Vent cowl			
	Net Total	3.000no	@123.09/no	369.27
1.030	50.18.7.4.2			
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall			
	Net Total	60.000metre	@295.71/metre	17742.60
1.031	50.18.7.6.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 10 Kfg/cm - Internal work- Exposed on wall			
	Net Total	50.000metre	@409.92/metre	20496.00
1.032	50.18.9.4.2			
	Providing and fixing PVC pipes includings joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 32 mm dia 6 Kgf/cm2			
	Net Total	50.000metre	@218.52/metre	10926.00
1.033	50.18.9.9.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	50.000metre	@521.14/metre	26057.00
1.034	50.18.9.13.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 25 mm dia 10 Kgf/cm2- External work - Exposed on wall			
	Net Total	50.000metre	@271.93/metre	13596.50
1.035	50.18.9.14.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - External work - Exposed on wall			
	Net Total	50.000metre	@305.29/metre	15264.50
1.036	50.18.9.18.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall			
	Net Total	50.000metre	@279.39/metre	13969.50
1.037	50.18.9.19.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/ clips/ at 1.00 m spacing . This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 mm dia 6 Kgf/cm2 - External work- Exposed on wall			
	Net Total	40.000metre	@379.40/metre	15176.00
1.038	13.1.1			
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	1063.447sqm	@308.22/sqm	327775.63
1.039	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	551.830sqm	@262.57/sqm	144894.00
1.040	11.36			
	Providing and fixing I st quality ceramic glazed wall tiles conforming to IS : 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer -in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3 kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.			
	Net Total	25.700sqm	@1190.03/sqm	30583.77
1.041	11.41.2			
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS :			

Sl No	Specification	Quantity	Rate	Amount
	15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.			
	Net Total	361.322sqm	@1733.20/sqm	626243.29
1.042	13.47.1			
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)			
	Net Total	553.507sqm	@186.15/sqm	103035.33
1.043	13.48.1			
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm			
	Net Total	1036.070sqm	@164.22/sqm	170143.42
1.044	13.52.1			
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work			
	Net Total	51.447sqm	@219.17/sqm	11275.64
1.045	10.28			
	Providing and fixing stainless steel (Grade 304) railing made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners, stainless steel bolts etc., of required size on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.)			
	Net Total	77.480kg	@664.68/kg	51499.41
1.046	17.3.1			
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.C. pan with ISI marked white solid plastic seat and lid			
	Net Total	3.000each	@7721.48/each	23164.44
1.047	50.17.1.4			
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.			
	Net Total	3.000no	@758.07/no	2274.21
1.048	17.7.3			

Sl No	Specification	Quantity	Rate	Amount
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 550x400 mm with a pair of 15 mm C.P. brass pillar taps			
	Net Total	3.000each	@3288.29/each	9864.87
1.049	18.51.1			
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore			
	Net Total	6.000each	@637.96/each	3827.76
1.050	18.52.1			
	Providing and fixing C.P brass stop cock (concealed) of standard design and of approved make conforming to IS: 893115 mm nominal bore			
	Net Total	9.000each	@700.27/each	6302.43
1.051	17.73.1			
	Providing and fixing PTMT towel rail complete with brackets fixed to wooden cleats with CP brass screws with concealed fitting arrangement of approved quality and colour450 mm long towel rail with total length of 495 mm, 78 mm wide and effective height of 88 mm. weighing not less than 170 gms			
	Net Total	2.000no	@641.43/no	1282.86
1.052	21.12.2			
	Providing and fixing aluminium tubular handle bar 32 mm outer dia, 3.0mm thick & 2100 mm long with S.S. screws etc. complete as per direction of Engineer -in-Charge.Powder coated minimum thickness 50 micron aluminium tubular handle bar			
	Net Total	14.000no	@649.84/no	9097.76
1.053	17.74			
	Providing and fixing PTMT shelf 440 mm long, 124 mm width and 36 mm height of approved quality and colour, weighing not less than 300 gms.			
	Net Total	3.000no	@741.89/no	2225.67
1.054	18.65			
	Providing and fixing PTMT Soap Dish Holder having length of 138 mm, breadth 102 mm, height of 75 mm with concealed fittings arrangements, weighing not less than 106 gms.			
	Net Total	4.000each	@150.72/each	602.88
1.055	17.71			
	Providing and fixing PTMT liquid soap container 109 mm wide, 125 mm high and 112 mm distance from wall of standard shape with bracket of the same materials with snap fittings of approved quality and colour, weighing not less than 105 gms			
	Net Total	2.000each	@183.17/each	366.34
1.056	17.10.1.2			
	Providing and fixing Stainless Steel A ISI 304 (18/8) kitchen sink as per IS 13983 with C.I. brackets and stainless steel plug 40 mm, including painting of fittings and brackets, cutting and making good the walls wherever required:			

Sl No	Specification	Quantity	Rate	Amount
	Kitchen sink with drain board510x 1040 mm bowl depth 225 mm			
	Net Total	1.000each	@6758.95/each	6758.95
1.057	17.31			
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.			
	Net Total	2.000each	@1481.95/each	2963.90
1.058	18.48			
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.			
	Net Total	1000.000Litre	@10.18/Litre	10180.00
1.059	8.2.2.2			
	Providing and fixing 18 mm thick gang saw cut, mirror, polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations, of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.Area of slab over 0.50 sqm			
	Net Total	0.700sqm	@4629.02/sqm	3240.31
1.060	16.21			
	Engraving letters in hard stone			
	Net Total	400.000per Letter per cm height	@9.46/per Letter per cm height	3784.00
1.061	13.71			
	Lettering with black Japan pint of approved brand and manufacture			
	Net Total	600.000per Letter per cm height	@5.47/per Letter per cm height	3282.00
			Heading Total(Rs)	7514539.85
			Total Estimation PAC	7514539.85
3	**Extra Charges**			
2.001	Provision for GST			
		7514539.85	18.00%	1352617.17
			Grand Total	8867157.02
			Round off	32842.98
			Rounded Total(Rs)	8900000.00
	Rupees Eighty Nine Lakh			

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of office room cum harbour surveillance camera room-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Civil work						
1.001	2.8.1						
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil						
	Earth work						
	Footing 2.0x2.0	26.000	2.200	2.200	1.550		195.052
	Long wall	3.000	21.500	0.800	0.750		38.700
	Short wall	3.000	13.000	0.800	0.750		23.400
	Cross wall-rooms	3.000	4.000	0.800	0.750		7.200
	Toilet	3.000	1.500	0.800	0.750		2.700
	Step	1.000	5.000	0.600	0.150		0.450
	Ramp	1.000	6.000	1.500	0.150		1.350
	Septic Tank	1.000	6.000	2.500	1.500		22.500
	Soak pit	1.000	1.250	1.250	1.100		1.719
	Total						**293.071**
						Total Quantity in cum	**293.071**
1.002	50.2.3.1						
	Pumping or Bailing out water and removing slush etc by using pump set including cost of labour, oil hire charges of pumpset, etc complete						
	Pumping						
	For footing	50.000					50.000
	Total						**50.000**
						Total Quantity in hour	**50.000**
1.003	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	PCC						
	Footing 2.0x2.0	26.000	2.200	2.200	0.150		18.876
	Long wall	3.000	21.500	0.800	0.150		7.740

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Short wall	3.000	13.000	0.800	0.150		4.680
	Cross wall-rooms	3.000	4.000	0.800	0.150		1.440
	Toilet	3.000	1.500	0.800	0.150		0.540
	Step	1.000	5.000	0.600	0.150		0.450
	Septic Tank	1.000	6.000	2.500	0.150		2.250
	Soak pit	1.000	1.250	1.250	0.150		0.234
	Total						**36.210**
						Total Quantity in cum	**36.210**
1.004	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	RR masonry						
	Long wall	3.000	21.500	0.600	0.600		23.220
	Short wall	3.000	13.000	0.600	0.600		14.040
	Cross wall-rooms	3.000	4.000	0.600	0.600		4.320
	Toilet	3.000	1.500	0.600	0.600		1.620
	Total						**43.200**
						Total Quantity in cum	**43.200**
1.005	50.2.25.1						
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge						
	Filling						
	Entrance and stair room	1.000	13.000	3.600	0.450		21.060
	office room	1.000	4.000	6.000	0.450		10.800
	store room	1.000	4.000	4.000	0.450		7.200
	rest room	1.000	4.000	4.000	0.450		7.200
	toilet	2.000	1.500	1.200	0.450		1.620
	wash area	1.000	2.200	2.600	0.450		2.574
	cabin side	1.000	8.800	17.200	0.450		68.112
	Total						**118.566**
						Total Quantity in cum	**118.566**
1.006	4.1.6						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	CC Flooring						
	Entrance and stair room	1.000	13.000	3.600	0.100		4.680
	office room	1.000	4.000	6.000	0.100		2.400
	store room	1.000	4.000	4.000	0.100		1.600
	rest room	1.000	4.000	4.000	0.100		1.600
	toilet	2.000	1.500	1.200	0.100		0.360
	wash area	1.000	2.200	2.600	0.100		0.572
	cabin side	1.000	8.800	17.200	0.100		15.136
	Total						**26.348**
						Total Quantity in cum	**26.348**
1.007	60.7.2						
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.						
	DR packing						
	Septic tank	1.000	6.000	2.500	0.300		4.500
	Soak pit	1.000	1.250	1.250	0.300		0.469
	Total						**4.969**
						Total Quantity in cum	**4.969**
1.008	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	RCC- upto plinth level						
	Footing	26.000	2.000	2.000	0.200		20.800
		26.000	1/3	(2*2)+(0.5*0.5)+(2*0.5)	0.200		9.100
	Footing pedestal	26.000	0.500	0.500	1.000		6.500
	Stair bottom slab	1.000	1.500	1.000	0.120		0.180
	Plinth beam-Long wall	3.000	21.500	0.450	0.450		13.061
	Short wall	3.000	13.000	0.450	0.450		7.898
	Cross wall-rooms	3.000	4.000	0.450	0.450		2.430

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Toilet	3.000	1.500	0.450	0.450		0.911
	Ramp	1.000	6.000	1.500	(0.60+0.15)/2		3.375
	Soak pit	1.000	4*1.25	0.200	1.000		1.000
	Septic Tank -bed slab	1.000	6.000	2.500	0.150		2.250
	Septic Tank -side wall	2.000	2.100	0.200	1.100		0.924
	Septic Tank -side wall	2.000	0.600	0.200	1.100		0.264
	Septic Tank - baffle wall	2.000	2.100	0.150	0.800		0.504
	Septic Tank - cover slab	1.000	6.000	2.500	0.150		2.250
	Soak pit -cover slab	1.000	1.250	1.250	0.100		0.156
	Total						**71.603**
						Total Quantity in cum	**71.603**
1.009	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	Columns						
	GF	24.000	0.300	0.400	3.300		9.504
	Porch	2.000	0.300	0.400	3.300		0.792
	FF	8.000	0.300	0.400	3.000		2.880
	FF	16.000	0.300	0.400	0.800		1.536
	Total						**14.712**
	Lintel						
	GF-Long wall	3.000	21.500	0.200	0.150		1.935
	Short wall	3.000	13.000	0.200	0.150		1.170
	Cross wall-rooms	3.000	4.000	0.200	0.150		0.360
	Toilet	3.000	2.700	0.200	0.150		0.243
		1.000	5.000	0.300	0.150		0.225
	FF- Long wall	2.000	13.000	0.200	0.150		0.780
	Short wall	2.000	3.600	0.200	0.150		0.216

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**4.929**
	Beam						
	longitudinal	6+2	3.850	0.300	0.350		3.234
		6+2	3.600	0.300	0.350		3.024
		7+2	4.750	0.300	0.350		4.489
	transverse	4+4	3.500	0.300	0.350		2.940
		8.000	5.800	0.300	0.350		4.872
		4.000	2.300	0.300	0.350		0.966
	porch	2.000	4.400	0.300	0.350		0.924
	Total						**20.449**
	Roof slab						
	GF	1.000	22.000	13.600	0.120		35.904
	Deduct stair room	-1.000	8.000	3.600	0.120		-3.456
	porch	1.000	5.400	4.200	0.120		2.722
	FF	1.000	13.600	4.400	0.120		7.181
	Total						**42.351**
	Sunshade						
	GF -Long wall	2.000	22.600	0.600	(0.1+0.07)/2		2.305
	Short	2.000	13.400	0.600	(0.1+0.07)/2		1.367
	FF	1.000	22.400	0.600	(0.1+0.07)/2		1.142
		2.000	3.000	0.600	(0.1+0.07)/2		0.306
	Total						**5.120**
	Sunshade						
	waist slab	1.000	3.400	1.500	0.120		0.612
	waist slab	1.000	3.900	1.500	0.120		0.702
	waist slab	1.000	1.000	1.500	0.120		0.180
	step	22.000	0.300	1.500	.15/2		0.743
	landing	2.000	1.500	1.500	0.120		0.540
	Total						**2.777**
						Total Quantity in cum	**90.338**
1.010	5.34.1						
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Columns						
	GF	24.000	0.300	0.400	3.300		9.504
	Porch	2.000	0.300	0.400	3.300		0.792
	FF	8.000	0.300	0.400	3.000		2.880
	FF	16.000	0.300	0.400	0.800		1.536
	Total						**14.712**
	RCC- upto plinth level						
	Footing	26.000	2.000	2.000	0.200		20.800
		26.000	1/3	(2*2)+(0.5*0.5)+(2*0.5)	0.200		9.100
	Footing pedestal	26.000	0.500	0.500	1.000		6.500
	Stair bottom slab	1.000	1.500	1.000	0.120		0.180
	Plinth beam-Long wall	3.000	21.500	0.450	0.450		13.061
	Short wall	3.000	13.000	0.450	0.450		7.898
	Cross wall-rooms	3.000	4.000	0.450	0.450		2.430
	Toilet	3.000	1.500	0.450	0.450		0.911
	Ramp	1.000	6.000	1.500	(0.60+0.15)/2		3.375
	Soak pit	1.000	4*1.25	0.200	1.000		1.000
	Septic Tank -bed slab	1.000	6.000	2.500	0.150		2.250
	Septic Tank -side wall	2.000	2.100	0.200	1.100		0.924
	Septic Tank -side wall	2.000	0.600	0.200	1.100		0.264
	Septic Tank - baffle wall	2.000	2.100	0.150	0.800		0.504
	Septic Tank - cover slab	1.000	6.000	2.500	0.150		2.250
	Soak pit -cover slab	1.000	1.250	1.250	0.100		0.156
	Total						**71.603**
	Lintel						
	GF-Long wall	3.000	21.500	0.200	0.150		1.935
	Short wall	3.000	13.000	0.200	0.150		1.170
	Cross wall-rooms	3.000	4.000	0.200	0.150		0.360
	Toilet	3.000	2.700	0.200	0.150		0.243
		1.000	5.000	0.300	0.150		0.225
	FF- Long wall	2.000	13.000	0.200	0.150		0.780

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Short wall	2.000	3.600	0.200	0.150		0.216
	Total						**4.929**
	Beam						
	longitudinal	6+2	3.850	0.300	0.350		3.234
		6+2	3.600	0.300	0.350		3.024
		7+2	4.750	0.300	0.350		4.489
	transverse	4+4	3.500	0.300	0.350		2.940
		8.000	5.800	0.300	0.350		4.872
		4.000	2.300	0.300	0.350		0.966
	porch	2.000	4.400	0.300	0.350		0.924
	Total						**20.449**
	Roof slab						
	GF	1.000	22.000	13.600	0.120		35.904
	Deduct stair room	-1.000	8.000	3.600	0.120		-3.456
	porch	1.000	5.400	4.200	0.120		2.722
	FF	1.000	13.600	4.400	0.120		7.181
	Total						**42.351**
	Sunshade						
	GF -Long wall	2.000	22.600	0.600	(0.1+0.07)/2		2.305
	Short	2.000	13.400	0.600	(0.1+0.07)/2		1.367
	FF	1.000	22.400	0.600	(0.1+0.07)/2		1.142
		2.000	3.000	0.600	(0.1+0.07)/2		0.306
	Total						**5.120**
	Sunshade						
	waist slab	1.000	3.400	1.500	0.120		0.612
	waist slab	1.000	3.900	1.500	0.120		0.702
	waist slab	1.000	1.000	1.500	0.120		0.180
	step	22.000	0.300	1.500	.15/2		0.743
	landing	2.000	1.500	1.500	0.120		0.540
	Total						**2.777**
						Total Quantity in cum	**161.941**
1.011	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	Footing & foundations						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Footing PCC	4*26	2.200		0.150		34.320
	Footing RCC	4*26	2.000		.2+.2		83.200
	Pedestal	4*26	0.500		1.000		52.000
	PCC- Long wall	3.000	21.500		0.150		9.675
	Short wall	3.000	13.000		0.150		5.850
	Cross wall-rooms	3.000	4.000		0.150		1.800
	Toilet	3.000	1.500		0.150		0.675
	Step	1.000	5.000		0.150		0.750
	Septic Tank-bed slab	1.000	6+2.5		0.150		1.275
	Soak pit-bed slab	1.000	1.250+1.250		0.150		0.375
	Septic Tank -side wall	2*2	2.1+6		1.100		35.640
	Septic Tank - baffle wall	2*2	2.100		0.800		6.720
	Septic Tank - cover slab	2.000	6+2.5		0.150		2.550
	Soak pit -cover slab	4.000	1.250		0.100		0.500
	Total						**235.330**
						Total Quantity in sqm	**235.330**
1.012	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Slabs						
	Waist slab	2.000	3.400		0.120		0.816
		1.000	3.400	1.500			5.100
		2.000	1.000		0.120		0.240
		1.000	1.000	1.500			1.500
		2.000	3.900		0.120		0.936
		1.000	3.900	1.500			5.850
	Step	22.000	0.300		.15/2		0.495
	Landing	2.000	1.500	1.500			4.500
	Roof slab-GF	1.000	22.000	13.600			299.200
	Roof slab-GF	2.000	22+13.6		0.120		8.544
	Deduct stair room	-1.000	8.000	3.600			-28.800
	porch roof slab	1.000	5.400	4.200			22.680
	porch roof slab	2.000	5.400+4.2		0.120		2.304

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Roof slab- FF	1.000	13.600	4.400			59.840
	Roof slab- FF	2.000	13.6+4.4		0.120		4.320
	Total						**387.525**
	Sunshade						
	GF -Long wall	2.000	22.600	0.600			27.120
		1.000	22.600		(0.1+0.07)/2		1.921
	Short	2.000	13.400	0.600			16.080
		1.000	13.400		(0.1+0.07)/2		1.139
	FF	2.000	22.400	0.600			26.880
		1.000	22.400		(0.1+0.07)/2		1.904
		2.000	3.000	0.600			3.600
		1.000	3.000		(0.1+0.07)/2		0.255
	Total						**78.899**
					Total Quantity in sqm		**466.424**
1.013	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	Plinth beam						
	Plinth beam-Long wall	2*3.000	21.500		0.450		58.050
	Short wall	2*3.000	13.000		0.450		35.100
	Cross wall-rooms	2*3.000	4.000	0.450	0.450		4.860
	Toilet	2*3.000	1.500	0.450	0.450		1.823
	Total						**99.833**
	Lintel						
	GF-Long wall	2*3.000	21.500		0.150		19.350
	Short wall	2*3.000	13.000		0.150		11.700
	Cross wall-rooms	2*3.000	4.000		0.150		3.600
	Toilet	2*3.000	2.700		0.150		2.430
		2*1.000	5.000		0.150		1.500

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	FF- Long wall	2*2.000	13.000		0.150		7.800
	Short wall	2*2.000	3.600		0.150		2.160
	Total						**48.540**
	Beams						
	longitudinal	2*8	3.850		0.350		21.560
		8.000	3.850	0.300			9.240
		2*8	3.600		0.350		20.160
		8.000	3.600	0.300			8.640
		2*9	4.750		0.350		29.925
		9.000	4.750	0.300			12.825
	transverse	2*8	3.500		0.350		19.600
		7.000	3.500	0.300			7.350
		2*8.000	5.800		0.350		32.480
		8.000	5.800	0.300			13.920
		2*4.000	2.300		0.350		6.440
		4.000	2.300	0.300			2.760
	porch	2*2.000	4.400		0.350		6.160
		2.000	4.400	0.300			2.640
	Total						**193.700**
						Total Quantity in sqm	**342.073**
1.014	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	Columns						
	GF	24.000	(0.300+0.4)*2		3.300		110.880
	porch column	2.000	(0.300+0.4)*2		3.300		9.240
	FF	8.000	(0.300+0.4)*2		3.000		33.600
		16.000	(0.300+0.4)*2		0.800		17.920
	Total						**171.640**
						Total Quantity in sqm	**171.640**
1.015	5.9.7						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Centering and shuttering including strutting, etc. and removal of form for:Stairs, (excluding landings) except spiral - staircases)						
	Stair steps						
	Step	22.000	1.500		0.150		4.950
	Step	22.000	0.300		.15/2		0.495
	Total						**5.445**
						Total Quantity in sqm	**5.445**
1.016	OD5511/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR						
	Steel						
	LS Qty-80kg/m3 For item no.5	72.000				80.000000	5760.000
	For item no.9	14.712				80.000000	1176.960
	For item no.10	75.626				80.000000	6050.080
	Total						**12987.040**
						Total Quantity in kilogram	**12987.040**
1.017	50.6.7.2						
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.						
	Laterite masonry						
	GF-Long wall	3.000	21.500	0.200	3.300		42.570
	Short wall	3.000	13.000	0.200	3.300		25.740
	Cross wall-rooms	3.000	4.000	0.200	3.300		7.920
	Toilet	3.000	2.700	0.200	3.300		5.346
	Step	1.000	5.000	0.600	0.300		0.900
		1.000	5.000	0.300	0.300		0.450
	FF- Long wall	2.000	13.000	0.200	3.000		15.600
	Parapet wall	1.000	17.26+13.4+17.26	0.150	0.800		5.750
	Toilet	3.000	2.700	0.200	3.300		5.346
	Rolling shutter	-1.000	4.600	0.200	3.000		-2.760
	Door-D	-2.000	1.200	0.200	2.100		-1.008
	D1	-5.000	1.000	0.200	2.100		-2.100
	Window	-12.000	1.500	0.200	1.500		-5.400

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	V1	-3.000	0.600	0.200	0.600		-0.216
	Glass panes	-2.000	3.700	0.200	1.500		-2.220
	Glass panes	-2.000	1.160	0.200	1.500		-0.696
	Glass panes	-2.000	3.500	0.200	1.500		-2.100
	Glass panes	-3.000	1.260	0.200	1.500		-1.134
	Glass panes	-1.000	2.100	0.200	1.500		-0.630
	Glass panes	-1.000	4.900	0.200	1.500		-1.470
	Total						**89.888**
						Total Quantity in cum	**89.888**
1.018	21.1.1.1						
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)						
	Aluminium door						
	Frame- Door D	2.000	5.400			2.000000	21.600
	Door D1	5.000	5.200			2.000000	52.000
	Shutter - Door D	2.000	8.400			1.000000	16.800
	Door D1	5.000	7.600			1.000000	38.000
	Window frame	12.000	4*(1.5+.8)			2.000000	220.800
	V1	3.000	4*0.600			2.000000	14.400
	Frames-Glass panes	2.000	2*(3.7+1.5)			2.000000	41.600
	Glass panes	2.000	2*(1.16+1.5)			2.000000	21.280
	Glass panes	2.000	2*(3.5+1.5)			2.000000	40.000
	Glass panes	3.000	2*(1.26+1.5)			2.000000	33.120

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Glass panes	1.000	2*(2.1+1.5)			2.000000	14.400
	Glass panes	1.000	2*(4.9+1.5)			2.000000	25.600
	Total						**539.600**
						Total Quantity in kg	**539.600**
1.019	21.2.2						
	Providing and fixing 12 mm thick prelaminated particle board flat pressed three layer or graded wood particle board conforming to IS : 12823 Grade I Type II, in panelling fixed in aluminum doors, windows shutters and partition frames with C.P. brass / stainless steel screws etc. complete as per architectural drawings and directions of Engineer - in- Charge.Pre- laminated particle board with decorative lamination on both sides						
	Panelling-Prelaminated particle board						
	Door D	2.000	1.000		0.900		1.800
	Door D1	5.000	0.800		0.900		3.600
	Total						**5.400**
						Total Quantity in sqm	**5.400**
1.020	21.3.2						
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 5.50 mm thickness						
	Glazing						
	Door-D	2.000	0.900		0.800		1.440
	D1	5.000	0.700		0.800		2.800
	Window	2*12.000	1.300		0.600		18.720
	V1	3.000	0.400		0.400		0.480
	Glass panes	2.000	3.600		1.400		10.080
	Glass panes	2.000	1.060		1.400		2.968
	Glass panes	2.000	3.400		1.400		9.520
	Glass panes	3.000	1.160		1.400		4.872
	Glass panes	1.000	2.000		1.400		2.800
	Glass panes	1.000	4.800		1.400		6.720
	Total						**60.400**
						Total Quantity in sqm	**60.400**
1.021	9.116						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing sliding arrangement in racks/ cupboards/cabinets shutter by with stainless steel rollers to run inside C or E aluminium channel section (The payment of C or E channel shall be made separately						
	Sliding arrangement						
	Windows	4*12					48.000
	Total						**48.000**
						Total Quantity in no	**48.000**
1.022	9.117.1						
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 48x40 mm						
	frame						
	D2	2*3	2.100				12.600
	D2	3.000	0.800				2.400
	Total						**15.000**
						Total Quantity in metre	**15.000**
1.023	9.118.1						
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).						
	Shutter						
	D2	3.000	0.800		2.000		4.800
	Total						**4.800**
						Total Quantity in sqm	**4.800**
1.024	9.53						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	Hold fast						
	Door	7*6				1.000000	42.000
	Window	12*4				1.000000	48.000
	V	3*2				1.000000	6.000
	Total						**96.000**
						Total Quantity in each	**96.000**
1.025	9.97.5						
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:100x10 mm						
	Tower bolt						
	Doors	12.000					12.000
	Total						**12.000**
						Total Quantity in no	**12.000**
1.026	9.88						
	Providing and fixing chromium plated brass 100 mm mortice latch and lock with 6 levers and a pair of lever handles of approved quality with necessary screws etc. complete.						
	Mortice latch						
	Doors	7.000					7.000
	Total						**7.000**
						Total Quantity in no	**7.000**
1.027	50.9.15.1						
	Supplying and fixing 200 mm Aluminium aldrop						
	Aluminium aldrop						
	For door D2	3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.028	10.6.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover						
	Rolling shutter						
	RS at entrance	1.000	4.600		3.000		13.800
	RS -FF	1.000	3.550		2.700		9.585
	Total						**23.385**
						Total Quantity in sqm	**23.385**
1.029	50.18.9.22.8						
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement -110 mm dia Vent cowl						
	Vent cowl						
	For toilet	3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.030	50.18.7.4.2						
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall						
	PVC Pipe						
	32mm	60.000					60.000
	Total						**60.000**
						Total Quantity in metre	**60.000**
1.031	50.18.7.6.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 10 Kfg/cm - Internal work- Exposed on wall						
	PVC Pipe						
	50mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.032	50.18.9.4.2						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing PVC pipes includings joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 32 mm dia 6 Kgf/cm2						
	PVC Pipe						
	32mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.033	50.18.9.9.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2						
	PVC Pipe						
	110mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.034	50.18.9.13.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 25 mm dia 10 Kgf/cm2- External work - Exposed on wall						
	PVC Pipe						
	25mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.035	50.18.9.14.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - External work - Exposed on wall						
	PVC Pipe						
	32mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.036	50.18.9.18.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall						
	PVC Pipe						
	75mm	50.000					50.000
	Total						**50.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in metre	**50.000**
1.037	50.18.9.19.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/ clips/ at 1.00 m spacing . This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 mm dia 6 Kgf/cm2 - External work- Exposed on wall						
	PVC Pipe						
	110mm	40.000					40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.038	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	Plastering-outside						
	GF	2.000	21.5+13.41		3.300		230.406
	FF	2.000	13.41+4		3.000		104.460
	Parapet wall	1.000	(17.26*2)+13.41		0.800+.8+.10		81.481
	Car porch column	2*2.000	.3+.4		3.300		9.240
	FF- Columns	6.000	(0.3+0.4)*2		0.800		6.720
		6.000	0.300	0.400			0.720
	Sunshade-GF - Long wall	2*2.000	22.600	0.600			54.240
	Short	2*2.000	13.400	0.600			32.160
	FF	2*1.000	22.400	0.600			26.880
		2*2.000	3.000	0.600			7.200
	Total						**553.507**
	Inside						
	Entrance & Stair room	2.000	13+3.6		3.300		109.560
	office room	2.000	4+6		3.300		66.000
	store room	2.000	4+4		3.300		52.800
	rest room	2.000	4+4		3.300		52.800
	toilet	2*3	1.5+1.2		3.300		53.460
	wash area	2.000	2.2+2.6		3.300		31.680
	cabin side	2.000	8.8+17.2		3.300		171.600

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	FF	2.000	13+3.6		3.000		99.600
	Column sides	3.000	(0.3+0.4) *2		3.300		13.860
	Total						**651.360**
	Deductions						
	Rolling shutter	-2*1.000	4.600		3.000	1.000000	-27.600
	Door-D	-2.000	1.200		2.100	1.000000	-5.040
	D1	-5.000	1.000		2.100	1.000000	-10.500
	Window	-12.000	1.500		1.500	1.000000	-27.000
	V1	-3.000	0.600		0.600	1.000000	-1.080
	Glass panes	-2*2.000	3.700		1.500	1.000000	-22.200
	Glass panes	-2.000	1.160		1.500	1.000000	-3.480
	Glass panes	-2*2.000	3.500		1.500	1.000000	-21.000
	Glass panes	-3.000	1.260		1.500	1.000000	-5.670
	Glass panes	-1.000	2.100		1.500	1.000000	-3.150
	Glass panes	-2*1.000	4.900		1.500	1.000000	-14.700
	Total						**-141.420**
						Total Quantity in sqm	**1063.447**
1.039	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	Ceiling plastering						
	Entrance and stair room	1.000	13.000	3.600			46.800
	office room	1.000	4.000	6.000			24.000
	store room	1.000	4.000	4.000			16.000
	rest room	1.000	4.000	4.000			16.000
	toilet	2.000	1.500	1.200			3.600
	wash area	1.000	2.200	2.600			5.720

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	cabin side	1.000	8.800	17.200			151.360
	FF	2.000	13.000	3.600			93.600
	Beams-longitudinal	6+2	3.850		.35+.3+.35		30.800
		6+2	3.600		.35+.3+.35		28.800
		7+2	4.750		.35+.3+.35		42.750
	transverse	4+4	3.500		.35+.3+.35		28.000
		8.000	5.800		.35+.3+.35		46.400
		4.000	2.300		.35+.3+.35		9.200
	porch	2.000	4.400		.35+.3+.35		8.800
	Total						**551.830**
						Total Quantity in sqm	**551.830**
1.040	11.36						
	Providing and fixing I st quality ceramic glazed wall tiles conforming to IS : 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer -in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3 kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.						
	Wall tiles						
	Toilet	2*3.000	1.5+1.2		1.500		24.300
	Wash area	1.000	2.000		0.700		1.400
	Total						**25.700**
						Total Quantity in sqm	**25.700**
1.041	11.41.2						
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.						
	Floor Tile						
	Entrance and stair room	1.000	13.000	3.600			46.800
	office room	1.000	4.000	6.000			24.000
	store room	1.000	4.000	4.000			16.000
	rest room	1.000	4.000	4.000			16.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	toilet	2.000	1.500	1.200			3.600
	wash area	1.000	2.200	2.600			5.720
	cabin side	1.000	8.800	17.200			151.360
	FF	1.000	13.000	3.600			46.800
	For Skirting - 15% of floor area	46.8+24+16+16+3.6+5.72+151.36+46.8				0.150000	46.542
	Step	2.000	5.000	0.300			3.000
		2.000	5.000		0.150		1.500
	Total						**361.322**
						Total Quantity in sqm	**361.322**
1.042	13.47.1						
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)						
	Exterior Paint						
	GF	2.000	21.5+13.41		3.300		230.406
	FF	2.000	13.41+4		3.000		104.460
	Parapet wall	1.000	(17.26*2)+13.41		0.800+.8+.10		81.481
	Car porch column	2*2.000	.3+.4		3.300		9.240
	FF- Columns	6.000	(0.3+0.4)*2		0.800		6.720
		6.000	0.300	0.400			0.720
	Sunshade-GF - Long wall	2*2.000	22.600	0.600			54.240
	Short	2*2.000	13.400	0.600			32.160
	FF	2*1.000	22.400	0.600			26.880
		2*2.000	3.000	0.600			7.200
	Total						**553.507**
						Total Quantity in sqm	**553.507**
1.043	13.48.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm						
	Interior Paint						
	Entrance & Stair room	2.000	13+3.6		3.300		109.560
	office room	2.000	4+6		3.300		66.000
	store room	2.000	4+4		3.300		52.800
	rest room	2.000	4+4		3.300		52.800
	toilet	2*3	1.5+1.2		3.300		53.460
	wash area	2.000	2.2+2.6		3.300		31.680
	cabin side	2.000	8.8+17.2		3.300		171.600
	FF	2.000	13+3.6		3.000		99.600
	Column sides	3.000	(0.3+0.4) *2		3.300		13.860
	Deductions-Rolling shutter	-2*1.000	4.600		3.000		-27.600
	Door-D	-2.000	1.200		2.100		-5.040
	D1	-5.000	1.000		2.100		-10.500
	Window	-12.000	1.500		1.500		-27.000
	V1	-3.000	0.600		0.600		-1.080
	Glass panes	-2*2.000	3.700		1.500		-22.200
	Glass panes	-2.000	1.160		1.500		-3.480
	Glass panes	-2*2.000	3.500		1.500		-21.000
	Glass panes	-3.000	1.260		1.500		-5.670
	Glass panes	-1.000	2.100		1.500		-3.150
	Glass panes	-2*1.000	4.900		1.500		-14.700
	Toilet- wall tile	-2*3	1.5+1.2		1.500		-24.300
	wash area- wall tile	-1.000	2.000		0.700		-1.400
	Ceiling- Entrance and stair room	1.000	13.000	3.600			46.800
	office room	1.000	4.000	6.000			24.000
	store room	1.000	4.000	4.000			16.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rest room	1.000	4.000	4.000			16.000
	toilet	2.000	1.500	1.200			3.600
	wash area	1.000	2.200	2.600			5.720
	cabin side	1.000	8.800	17.200			151.360
	FF	2.000	13.000	3.600			93.600
	Beams-longitudinal	6+2	3.850		.35+.3+.35		30.800
		6+2	3.600		.35+.3+.35		28.800
		7+2	4.750		.35+.3+.35		42.750
	transverse	4+4	3.500		.35+.3+.35		28.000
		8.000	5.800		.35+.3+.35		46.400
		4.000	2.300		.35+.3+.35		9.200
	porch	2.000	4.400		.35+.3+.35		8.800
	Total						**1036.070**
						Total Quantity in sqm	**1036.070**
1.044	13.52.1						
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work						
	Epoxy paint						
	RS at entrance	2.000	4.600		3.000	1.100000	30.360
	RS -FF	2.000	3.550		2.700	1.100000	21.087
	Total						**51.447**
						Total Quantity in sqm	**51.447**
1.045	10.28						
	Providing and fixing stainless steel (Grade 304) railing made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners, stainless steel bolts etc., of required size on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.)						
	Hand Rail						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	50mm Pipe	1.000	10.000			2.400000	24.000
	40mm Pipe	10.000	0.800			1.910000	15.280
		2.000	10.000			1.910000	38.200
	Total						**77.480**
						Total Quantity in kg	**77.480**
1.046	17.3.1						
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.C. pan with ISI marked white solid plastic seat and lid						
	WC						
	Water Closet	3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.047	50.17.1.4						
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.						
	Health Faucet						
		3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.048	17.7.3						
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 550x400 mm with a pair of 15 mm C.P. brass pillar taps						
	Wash basin						
	Wash basin	3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.049	18.51.1						
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore						
	Bib cock						
	Bib cock	6.000					6.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**6.000**
						Total Quantity in each	**6.000**
1.050	18.52.1						
	Providing and fixing C.P brass stop cock (concealed) of standard design and of approved make conforming to IS: 893115 mm nominal bore						
	Stop cock						
	For Health faucet and water closet	3*2					6.000
	For wash basin	3.000					3.000
	Total						**9.000**
						Total Quantity in each	**9.000**
1.051	17.73.1						
	Providing and fixing PTMT towel rail complete with brackets fixed to wooden cleats with CP brass screws with concealed fitting arrangement of approved quality and colour450 mm long towel rail with total length of 495 mm, 78 mm wide and effective height of 88 mm. weighing not less than 170 gms						
	Towel rail						
	For wash room	2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.052	21.12.2						
	Providing and fixing aluminium tubular handle bar 32 mm outer dia, 3.0mm thick & 2100 mm long with S.S. screws etc. complete as per direction of Engineer -in-Charge.Powder coated minimum thickness 50 micron aluminium tubular handle bar						
	Aluminium handle bar						
	For doors	7*2					14.000
	Total						**14.000**
						Total Quantity in no	**14.000**
1.053	17.74						
	Providing and fixing PTMT shelf 440 mm long, 124 mm width and 36 mm height of approved quality and colour, weighing not less than 300 gms.						
	PTMT Shelf						
	For Toilet	3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.054	18.65						
	Providing and fixing PTMT Soap Dish Holder having length of 138 mm, breadth 102 mm, height of 75 mm with concealed fittings arrangements, weighing not less than 106 gms.						
	Soap dish						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		4.000					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**
1.055	17.71						
	Providing and fixing PTMT liquid soap container 109 mm wide, 125 mm high and 112 mm distance from wall of standard shape with bracket of the same materials with snap fittings of approved quality and colour, weighing not less than 105 gms						
	Fixing liquid soap container						
	liquid soap container	2.000					2.000
	Total						**2.000**
						Total Quantity in each	**2.000**
1.056	17.10.1.2						
	Providing and fixing Stainless Steel A ISI 304 (18/8) kitchen sink as per IS 13983 with C.I. brackets and stainless steel plug 40 mm, including painting of fittings and brackets, cutting and making good the walls wherever required: Kitchen sink with drain board510x 1040 mm bowl depth 225 mm						
	Kitchen sink						
	In rest room	1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
1.057	17.31						
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.						
	Fixing mirror						
	mirror	2.000					2.000
	Total						**2.000**
						Total Quantity in each	**2.000**
1.058	18.48						
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.						
	Water tank						
	Water tank	1.000	1000.000				1000.000
	Total						**1000.000**
						Total Quantity in Litre	**1000.000**
1.059	8.2.2.2						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing 18 mm thick gang saw cut, mirror, polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations, of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.Area of slab over 0.50 sqm						
	Inauguration stones						
	Inauguration stone	1.000	1.000	0.700			0.700
	Total						**0.700**
						Total Quantity in sqm	**0.700**
1.060	16.21						
	Engraving letters in hard stone						
	Engraving on the inauguration stone						
	For inauguration stone	200.000			2.000		400.000
	Total						**400.000**
						Total Quantity in per Letter per cm height	**400.000**
1.061	13.71						
	Lettering with black Japan pint of approved brand and manufacture						
	For lettering on Office Name Board						
	say 200Letters	200.000			3.000		600.000
	Total						**600.000**
						Total Quantity in per Letter per cm height	**600.000**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Water Supply Arrangements in the Harbour-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Construction of OH RCC Water Tank and Pump House**			
1.001	2.31			
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared			
	Net Total	400.000sqm	@14.48/sqm	5792.00
1.002	OD1292/2022-2023			
	Chipping and removing top of RCC piles to lines and levels carefully without damaging remaining portion of pile and removing debris upto a distance of 150 m including all labour charges , hire of equipments etc.complete as per directions of departmental officers at site Unit- cum Taking output - 1.25 cum			
	Net Total	2.543cum	@3537.94/cum	8996.98
1.003	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	65.340cum	@210.02/cum	13722.71
1.004	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	6.534cum	@6687.21/cum	43694.23
1.005	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	33.074cum	@9237.20/cum	305511.15
1.006	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content			

Sl No	Specification	Quantity	Rate	Amount
	as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	88.000cum	@10858.36/cum	955535.68
1.007	5.34.1			
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	121.074cum	@80.55/cum	9752.51
1.008	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	38.280sqm	@329.03/sqm	12595.27
1.009	OD5503/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - HCR Fe-500D or more			
	Net Total	13858.800kg	@96.62/kg	1339037.26
1.010	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	179.280sqm	@847.44/sqm	151929.04
1.011	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	200.160sqm	@800.47/sqm	160222.08
1.012	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	133.770sqm	@637.63/sqm	85295.77
1.013	50.6.7.2			
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.			
	Net Total	12.900cum	@7872.96/cum	101561.18
1.014	9.143			
	Providing and fixing factory made uPVC door frame, made of uPVC extruded			

Sl No	Specification	Quantity	Rate	Amount
	section, of size 65 mm x 55 mm with wall thickness 2.0 mm (? 0.2mm), corners of the door frame to be mitred cut and jointed with plastic brackets and stainless steel screws, reinforcing hinge side vertical of the frames with PVC profile of Size 28 mm x 30 mm having wall thickness 2 mm (? 0.2 mm), including providing & fixing 3 nos of 125 mm long stainless steel hinges to the frame, fixing the frame with jamb with required number & size of anchor dash fastners, all complete as per manufacturer's specification and direction of Engineer-in-charge.			
	Net Total	6.500metre	@610.23/metre	3966.50
1.015	9.142.2			
	35 mm thick factory made Solid panel PVC Door shutter, made out of single piece extruded solid PVC (±0.2 mm) thick, having styles & rails (except lock rail) of size 95 mmx 35 mm x 5 mm, out of which 75 mm shall be flat and 20 mm shall be tapered (on both side), having one side thickness of 15 mm integrally extruded on the hinges side of the profile for better screw holding power, including reinforcing with MS tube of size 40 mm x 20 mm x 1 mm, joints of styles & rails to be mitered cut & joint with the help of PVC solvent cement, self driven self tapping screws & M.S. rectangular pipes bracket of size 190 mm x 100 mm of cross section size 35 mm x 17 mm s 1 mm at each corner. Single piece extruded 5 mm thick solid PVC Lock rail of size 115 mm x 35 mm x 35 mm, out of which 95 mm to be flat and 20 mm to be tapered at both ends, having 15 mm solid core in middle of rail section integrally extruded, fixing the styles & rails with the help of solvent and self driven self tapping screws of 125 mm x 11 mm, including providing 5 mm Single piece solid PVC extruded sheet inserted in the door as panel, all complete as per manufacturer's specification and direction of Engineer-in-charge.Decorative finish (wood grained finish)			
	Net Total	2.100sqm	@4438.67/sqm	9321.21
1.016	9.147.5			
	Providing and fixing factory made uPVC white colour casement/casement cum fixed glazed windows comprising of uPVC multi-chambered frame, sash and mullion (where ever required) extruded profiles duly reinforced with 1.60 +/- 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), uPVC extruded glazing beads of appropriate dimension, EPDM gasket, stainless steel (SS 304 grade) friction hinges, zinc alloy (white powder coated) casement handles, G.I fasteners 100 x 8 mm size for fixing frame to finished wall, plastic packers, plastic caps and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, mullion (if required) shall be also fusion welded including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, all complete as per approved drawing & direction of Engineer-in-Charge. (Single / double glass panes and silicon sealant shall be paid separately) Note: For uPVC frame, sash and mullion extruded profiles minus 5% tolerance in dimension i.e. in depth & width of profile shall be acceptable.Casement window double panels with S.S. friction hinges (350 x 19 x 1.9 mm) made of (big series)frame 67 x 60 mm & sash / mullion 67 x 80 mm both having wall thickness of 2.3 ± 0.2 mm and single glazing bead/ double glazing bead of appropriate dimension. (Area of window above 1.50 sqm).			
	Net Total	3.000sqm	@11164.86/sqm	33494.58

Sl No	Specification	Quantity	Rate	Amount
1.017	9.7.7.1			
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick: Float glass panes4 mm thick glass pane			
	Net Total	2.240sqm	@2070.48/sqm	4637.88
1.018	9.100.2			
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm			
	Net Total	2.000no	@61.02/no	122.04
1.019	9.97.3			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm			
	Net Total	4.000no	@103.95/no	415.80
1.020	50.9.15.2			
	Supplying and fixing 300 mm Aluminium aldrop			
	Net Total	1.000no	@188.93/no	188.93
1.021	13.7.2			
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	577.730sqm	@379.14/sqm	219040.55
1.022	13.15			
	20 mm cement plaster 1:2 (1 cement : 2 stone dust)			
	Net Total	3.000sqm	@476.55/sqm	1429.65
1.023	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	151.640sqm	@262.57/sqm	39816.11
1.024	10.25.2			
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works			
	Net Total	4000.000kg	@151.29/kg	605160.00
1.025	13.43.1			
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	729.370sqm	@69.33/sqm	50567.22
1.026	13.60.1			
	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade:Two or more coats on new work			
	Net Total	729.370sqm	@148.59/sqm	108377.09
1.027	50.18.9.9.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2			
	Net Total	150.000metre	@521.14/metre	78171.00
1.028	50.18.8.8.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 75 mm pipe 6 Kgf/cm2			
	Net Total	20.000metre	@614.17/metre	12283.40
1.029	18.17.5			
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :65 mm nominal bore			
	Net Total	5.000each	@1718.82/each	8594.10
1.030	50.18.9.8.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2			
	Net Total	1000.000metre	@356.56/metre	356560.00
1.031	50.18.7.4.2			
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall			
	Net Total	750.000metre	@295.71/metre	221782.50
1.032	18.17.2			
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :32 mm nominal bore			
	Net Total	10.000each	@671.37/each	6713.70
1.033	18.32.1			
	Constructing masonry chamber 30x30x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for stop cock, with C.I. surface box 100x100x75 mm (inside) with hinged cover fixed in cement concrete slab 1:2:4 mix (1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm			

Sl No	Specification	Quantity	Rate	Amount
	nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S (non modular) bricks of class designation 7.5			
	Net Total	3.000each	@1827.73/each	5483.19
1.034	50.18.9.21.4			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend			
	Net Total	10.000no	@87.89/no	878.90
1.035	50.18.9.21.9			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling			
	Net Total	5.000no	@72.21/no	361.05
1.036	18.59.2			
	Providing and fixing C.I double acting air valve of approved quality with bolts, nuts, rubber insertion etc. complete (The tail pieces, tapers etc. if required will be paid separately):80 mm dia			
	Net Total	3.000no	@7208.30/no	21624.90
1.037	50.18.9.6.2			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2			
	Net Total	100.000metre	@240.68/metre	24068.00
1.038	50.18.9.21			
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Elbow			
	Net Total	10.000no	@94.28/no	942.80
1.039	50.18.9.21.5			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee			
	Net Total	10.000no	@94.65/no	946.50
1.040	18.15.2			
	Providing and fixing brass bib cock of approved quality :20 mm nominal bore			
	Net Total	20.000each	@377.04/each	7540.80
1.041	18.60.1			
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore			
	Net Total	1.000each	@4130.60/each	4130.60
			Heading Total(Rs)	5020264.86

Sl No	Specification	Quantity	Rate	Amount
2	**Pile liners and miscellaneous items for piling**			
2.001	12.22			
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.			
	Net Total	4.033MT	@125636.20/MT	506690.79
2.002	OD1321/2022-2023			
	Driving down vertically M.s Liner already fabricated to the required depth by power winch and accessories including all hire charge of machinery , labour charges etc complete			
	Net Total	45.000metre	@568.30/metre	25573.50
2.003	OD1325/2022-2023			
	Supply, Fitting and Placing in position reinforcement in cages using HCR bar Reinforcement including cost of materials, labour charges, conveyance and placing the cages in bore holes providing precast cover blocks etc, complete as per Drawing and Technical Specificationsand as directed by Engineer in charge excluding cost of welding charges. Unit = 1 MT Taking output = 1 MT a) Material			
	Net Total	38.565tonne	@98321.63/tonne	3791773.66
2.004	12.23.3			
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm			
	Net Total	225.000metre	@7210.41/metre	1622342.25
			Heading Total(Rs)	5946380.20
3	**Construction of Sump**			
3.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	65.340cum	@210.02/cum	13722.71
3.002	60.7.4			
	DR PACKING FOR APRONS - Rough stone dry packing for apron with good quality blasted rubble including packing to compactness to lines levels, cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site			
	Net Total	19.602cum	@3557.50/cum	69734.12
3.003	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4			

Sl No	Specification	Quantity	Rate	Amount
	coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	6.534cum	@6687.21/cum	43694.23
3.004	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	3.960sqm	@329.03/sqm	1302.96
3.005	5.9.2			
	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.			
	Net Total	125.600sqm	@703.77/sqm	88393.51
3.006	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	34.020sqm	@800.47/sqm	27231.99
3.007	5.1.2			
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size			
	Net Total	8.000cum	@8914.94/cum	71319.52
3.008	5.2.2			
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)			
	Net Total	13.000cum	@10748.82/cum	139734.66
3.009	5.3			
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).			
	Net Total	6.000cum	@11277.61/cum	67665.66
3.010	5.22.1			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelMild steel and Medium Tensile steel bars			
	Net Total	640.000kg	@94.84/kg	60697.60
3.011	5.22A.1			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Mild steel and Medium			

Sl No	Specification	Quantity	Rate	Amount
	Tensile steel bars			
	Net Total	2160.000kilogram	@94.84/kilogram	204854.40
3.012	50.13.1			
	9 mm cement plastering of mix : 1:3 (1 cement : 3 fine sand) including all cost of materials, labour charges etc complete			
	Net Total	59.200sqm	@285.84/sqm	16921.73
3.013	13.9.1			
	Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster			
	Net Total	66.400sqm	@404.42/sqm	26853.49
3.014	50.18.9.19.2			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 m dia 4 Kgf/cm2 - External work - Exposed on wall			
	Net Total	10.000metre	@329.39/metre	3293.90
3.015	50.18.9.8.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2			
	Net Total	50.000metre	@356.56/metre	17828.00
3.016	50.18.9.18.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall			
	Net Total	50.000metre	@279.39/metre	13969.50
3.017	50.18.7.6.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing . This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 6 Kgf/cm2 - Internal work- Exposed on wall			
	Net Total	20.000metre	@369.84/metre	7396.80
3.018	50.18.9.6.2			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2			
	Net Total	20.000metre	@240.68/metre	4813.60
3.019	50.18.9.21.4			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	5.000no	@87.89/no	439.45
3.020	50.18.9.21.5			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee			
	Net Total	5.000no	@94.65/no	473.25
3.021	50.18.9.21.8			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75 mm dia End cap			
	Net Total	1.000no	@64.08/no	64.08
3.022	50.18.9.21.9			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling			
	Net Total	2.000no	@72.21/no	144.42
3.023	18.37.1			
	Constructing masonry chamber 60x45x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for water meter complete with C.I double flap surface box 400x200x200 mm (inside) with locking arrangement and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 grades stone aggregate 20 nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S. (non modular) bricks of class designation 7.5			
	Net Total	1.000each	@9587.28/each	9587.28
3.024	18.60.1			
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore			
	Net Total	1.000each	@4130.60/each	4130.60
			Heading Total(Rs)	894267.46
			Total Estimation PAC	11860912.52

Sl No	Description	Percentage/LS	Amount
4	**Lumsum Heading**		
4.001	LS provision for part TS		
	0.00	0.00%	2000000.00
4.002	Water connection charges (KWA)		
	0.00	0.00%	1000000.00
4.003	LS Amount for Electrification		
	0.00	0.00%	1900000.00
		Total Lumsum Amount	4900000.00

Sl No	Specification	Quantity	Rate	Amount
5	**Extra Charges**			
4.001	Provision for GST			
		11860912.52	18.00%	2134964.25
			Grand Total	18895876.77
			Round off	4123.23
			Rounded Total(Rs)	18900000.00
	Rupees One Crore Eighty Nine Lakh			

ePRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Water Supply Arrangements in the Harbour-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Construction of OH RCC Water Tank and Pump House						
1.001	2.31						
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared						
	site clearance						
		1.000	20.000	20.000			400.000
	Total						**400.000**
						Total Quantity in sqm	**400.000**
1.002	OD1292/2022-2023						
	Chipping and removing top of RCC piles to lines and levels carefully without damaging remaining portion of pile and removing debris upto a distance of 150 m including all labour charges , hire of equipments etc.complete as per directions of departmental officers at site Unit- cum Taking output - 1.25 cum						
	for pile						
		9.000	3.140/4	.6*.6	1.000	1.000000	2.543
	Total						**2.543**
						Total Quantity in cum	**2.543**
1.003	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	for pile cap						
		1.000	6.600	6.600	1.500		65.340
	Total						**65.340**
						Total Quantity in cum	**65.340**
1.004	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	for pile pcc						
		1.000	6.600	6.600	0.150		6.534
	Total						**6.534**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**6.534**
1.005	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	column upto GL and footing						
	column upto GL	9.000	0.600	0.600	0.700		2.268
	Raft	1.000	6.400	6.400	0.750		30.720
	rounding	1.000	0.086				0.086
	Total						**33.074**
						Total Quantity in cum	**33.074**
1.006	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	columns and walls						
	column from GL to top	9.000	0.400	0.400	12.450		17.928
	Wall of water tank	2.000	6.000	0.250	3.000		9.000
		2.000	5.600	0.250	3.000		8.400
	rounding	1.000	2.672				2.672
	Total						**38.000**
	Beams and slab						
	tie beams	12*3	2.400	0.300	0.300		7.776
	haunch	24*3	0.300	0.300	0.300		1.944
	bottom slab for tank	1.000	7.600	7.600	0.250		14.440
	bottom beam for slab	3.000	6.000	0.300	0.300		1.620
		3.000	5.100	0.300	0.300		1.377

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	top slab cover	1.000	6.000	6.000	0.120		4.320
	slab on GF	1.000	7.600	7.600	0.150		8.664
	slab projections	2*4	7.600	0.800	0.150		7.296
	lintel GF	1.000	6.000	0.200	0.200		0.240
	sunshade GF	1.000	6.000	0.600	0.100		0.360
	rounding	1.000	1.963				1.963
	Total						**50.000**
						Total Quantity in cum	**88.000**
1.007	5.34.1						
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	column upto GL and footing						
	column upto GL	9.000	0.600	0.600	0.700		2.268
	Raft	1.000	6.400	6.400	0.750		30.720
	rounding	1.000	0.086				0.086
	Total						**33.074**
	columns and walls						
	column from GL to top	9.000	0.400	0.400	12.450		17.928
	Wall of water tank	2.000	6.000	0.250	3.000		9.000
		2.000	5.600	0.250	3.000		8.400
	rounding	1.000	2.672				2.672
	Total						**38.000**
	Beams and slab						
	tie beams	12*3	2.400	0.300	0.300		7.776
	haunch	24*3	0.300	0.300	0.300		1.944
	bottom slab for tank	1.000	7.600	7.600	0.250		14.440
	bottom beam for slab	3.000	6.000	0.300	0.300		1.620
		3.000	5.100	0.300	0.300		1.377
	top slab cover	1.000	6.000	6.000	0.120		4.320
	slab on GF	1.000	7.600	7.600	0.150		8.664
	slab projections	2*4	7.600	0.800	0.150		7.296
	lintel GF	1.000	6.000	0.200	0.200		0.240
	sunshade GF	1.000	6.000	0.600	0.100		0.360

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	1.963				1.963
	Total						**50.000**
						Total Quantity in cum	**121.074**
1.008	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	for pile cap						
	for pcc	4.000	6.600		0.150		3.960
	for pile cap	4.000	6.400		0.750		19.200
	column upto GL	9.000	2.400		0.700		15.120
	Total						**38.280**
						Total Quantity in sqm	**38.280**
1.009	OD5503/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - HCR Fe-500D or more						
	Reinforcement						
		1.000	38.000			120.000000	4560.000
		1.000	50.000			120.000000	6000.000
	Total						**10560.000**
	column						
	column upto GL	9.000	0.600	0.600	0.700	100.000000	226.800
	Raft	1.000	6.400	6.400	0.750	100.000000	3072.000
	Total						**3298.800**
						Total Quantity in kg	**13858.800**
1.010	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	column						
		9.000	1.600		12.450		179.280
	Total						**179.280**
						Total Quantity in sqm	**179.280**
1.011	5.9.3						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	slabs						
	bottom slab for tank	1.000	7.600	7.600			57.760
	top slab cover	1.000	6.000	6.000			36.000
	slab on GF	1.000	7.600	7.600			57.760
	slab projections	2*4	7.600	0.800			48.640
	Total						**200.160**
						Total Quantity in sqm	**200.160**
1.012	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	beams						
	tie beams	12*3	2.400	0.900			77.760
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	lintel GF	1.000	6.000	0.400			2.400
	Sunshade GF	1.000	6.000	0.700			4.200
	Total						**133.770**
						Total Quantity in sqm	**133.770**
1.013	50.6.7.2						
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.						
	Pump house at GF						
	long wall	2.000	6.000	0.200	3.000		7.200
	cross wall	2.000	5.600	0.200	3.000		6.720
	Total						**13.920**
	deduction						
	door	-1.000	1.000	0.200	2.100		-0.420
	window	-1.000	2.000	0.200	1.500		-0.600
	Total						**-1.020**
						Total Quantity in cum	**12.900**
1.014	9.143						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing factory made uPVC door frame, made of uPVC extruded section, of size 65 mm x 55 mm with wall thickness 2.0 mm (? 0.2mm), corners of the door frame to be mitred cut and jointed with plastic brackets and stainless steel screws, reinforcing hinge side vertical of the frames with PVC profile of Size 28 mm x 30 mm having wall thickness 2 mm (? 0.2 mm), including providing & fixing 3 nos of 125 mm long stainless steel hinges to the frame, fixing the frame with jamb with required number & size of anchor dash fastners, all complete as per manufacturer's specification and direction of Engineer-in-charge.						
	door						
		1.000	6.500				6.500
	Total						**6.500**
						Total Quantity in metre	**6.500**
1.015	9.142.2						
	35 mm thick factory made Solid panel PVC Door shutter, made out of single piece extruded solid PVC (±0.2 mm) thick, having styles & rails (except lock rail) of size 95 mmx 35 mm x 5 mm, out of which 75 mm shall be flat and 20 mm shall be tapered (on both side), having one side thickness of 15 mm integrally extruded on the hinges side of the profile for better screw holding power, including reinforcing with MS tube of size 40 mm x 20 mm x 1 mm, joints of styles & rails to be mitered cut & joint with the help of PVC solvent cement, self driven self tapping screws & M.S. rectangular pipes bracket of size 190 mm x 100 mm of cross section size 35 mm x 17 mm s 1 mm at each corner. Single piece extruded 5 mm thick solid PVC Lock rail of size 115 mm x 35 mm x 35 mm, out of which 95 mm to be flat and 20 mm to be tapered at both ends, having 15 mm solid core in middle of rail section integrally extruded, fixing the styles & rails with the help of solvent and self driven self tapping screws of 125 mm x 11 mm, including providing 5 mm Single piece solid PVC extruded sheet inserted in the door as panel, all complete as per manufacturer's specification and direction of Engineer-in-charge.Decorative finish (wood grained finish)						
	door						
		1.000	1.000		2.100		2.100
	Total						**2.100**
						Total Quantity in sqm	**2.100**
1.016	9.147.5						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing factory made uPVC white colour casement/casement cum fixed glazed windows comprising of uPVC multi-chambered frame, sash and mullion (where ever required) extruded profiles duly reinforced with 1.60 +/- 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), uPVC extruded glazing beads of appropriate dimension, EPDM gasket, stainless steel (SS 304 grade) friction hinges, zinc alloy (white powder coated) casement handles, G.I fasteners 100 x 8 mm size for fixing frame to finished wall, plastic packers, plastic caps and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, mullion (if required) shall be also fusion welded including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, all complete as per approved drawing & direction of Engineer-in-Charge. (Single / double glass panes and silicon sealant shall be paid separately) Note: For uPVC frame, sash and mullion extruded profiles minus 5% tolerance in dimension i.e. in depth & width of profile shall be acceptable.Casement window double panels with S.S. friction hinges (350 x 19 x 1.9 mm) made of (big series)frame 67 x 60 mm & sash / mullion 67 x 80 mm both having wall thickness of 2.3 ± 0.2 mm and single glazing bead/ double glazing bead of appropriate dimension. (Area of window above 1.50 sqm).						
	window						
		1.000	2.000		1.500		3.000
	Total						**3.000**
						Total Quantity in sqm	**3.000**
1.017	9.7.7.1						
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick: Float glass panes4 mm thick glass pane						
	window						
		4.000	0.400		1.400		2.240
	Total						**2.240**
						Total Quantity in sqm	**2.240**
1.018	9.100.2						
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm						
	door						
		2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.019	9.97.3						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm						
	door						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.020	50.9.15.2						
	Supplying and fixing 300 mm Aluminium aldrop						
	for door						
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.021	13.7.2						
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:4 (1 cement : 4 fine sand)						
	plastering						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	Total						**448.730**
	pump house						
	long wall	2*2	6.000		3.000		72.000
	cross wall	2*2	5.600		3.000		67.200
	door	-1*2	1.000		2.100		-4.200
	window	-1*2	2.000		1.500		-6.000
	Total						**129.000**
						Total Quantity in sqm	**577.730**
1.022	13.15						
	20 mm cement plaster 1:2 (1 cement : 2 stone dust)						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Inside water tank						
	Floor of slab (excluding haunch)	1.000					1.000
	Vertical sides	1.000					1.000
	Haunchings	1.000					1.000
	Total						**3.000**
						Total Quantity in sqm	**3.000**
1.023	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	ceiling						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**151.640**
1.024	10.25.2						
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works						
	For Ladder						
	Ladder for (Stage height 12.45 m)	4.000	1000.000			1.000000	4000.000
	Total						**4000.000**
						Total Quantity in kg	**4000.000**
1.025	13.43.1						
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	painting						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	pump house-long wall	2*2	6.000		3.000		72.000
	do-cross wall	2*2	5.600		3.000		67.200
	do-door	-1*2	1.000		2.100		-4.200
	do-window	-1*2	2.000		1.500		-6.000
	Total						**577.730**
	painting ceilings						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**729.370**
1.026	13.60.1						
	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade:Two or more coats on new work						
	painting						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	pump house-long wall	2*2	6.000		3.000		72.000
	do-cross wall	2*2	5.600		3.000		67.200
	do-door	-1*2	1.000		2.100		-4.200

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	do-window	-1*2	2.000		1.500		-6.000
	Total						**577.730**
	painting ceiling						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**729.370**
1.027	50.18.9.9.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2						
	pipe line						
		150.000					150.000
	Total						**150.000**
						Total Quantity in metre	**150.000**
1.028	50.18.8.8.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 75 mm pipe 6 Kgf/cm2						
	pipe line						
		20.000					20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
1.029	18.17.5						
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :65 mm nominal bore						
	for supply lines						
		5.000					5.000
	Total						**5.000**
						Total Quantity in each	**5.000**
1.030	50.18.9.8.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	supply line						
		1000.000					1000.000
	Total						**1000.000**
						Total Quantity in metre	**1000.000**
1.031	50.18.7.4.2						
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall						
	pipe line						
		1.000	750.000				750.000
	Total						**750.000**
						Total Quantity in metre	**750.000**
1.032	18.17.2						
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :32 mm nominal bore						
	for supply lines						
		10.000					10.000
	Total						**10.000**
						Total Quantity in each	**10.000**
1.033	18.32.1						
	Constructing masonry chamber 30x30x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for stop cock, with C.I. surface box 100x100x75 mm (inside) with hinged cover fixed in cement concrete slab 1:2:4 mix (1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S (non modular) bricks of class designation 7.5						
	for inspection chamber						
		3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.034	50.18.9.21.4						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend						
	bend						
		10.000					10.000
	Total						**10.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in no	**10.000**
1.035	50.18.9.21.9						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling						
	socket						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
1.036	18.59.2						
	Providing and fixing C.I double acting air valve of approved quality with bolts, nuts, rubber insertion etc. complete (The tail pieces, tapers etc. if required will be paid separately):80 mm dia						
	air valve						
		3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.037	50.18.9.6.2						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2						
	pipe line						
		100.000					100.000
	Total						**100.000**
						Total Quantity in metre	**100.000**
1.038	50.18.9.21						
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Elbow						
	elbow						
		10.000					10.000
	Total						**10.000**
						Total Quantity in no	**10.000**
1.039	50.18.9.21.5						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee						
	tee						
		10.000					10.000
	Total						**10.000**
						Total Quantity in no	**10.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.040	18.15.2						
	Providing and fixing brass bib cock of approved quality :20 mm nominal bore						
	bib cock						
		20.000					20.000
	Total						**20.000**
						Total Quantity in each	**20.000**
1.041	18.60.1						
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore						
	water meter						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
2	Pile liners and miscellaneous items for piling						
2.001	12.22						
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.						
	6 mm liner 47.1 kg/m2						
		9.000	3.14*.606	47.1/1000	5.000		4.033
	Total						**4.033**
						Total Quantity in MT	**4.033**
2.002	OD1321/2022-2023						
	Driving down vertically M.s Liner already fabricated to the required depth by power winch and accessories including all hire charge of machinery , labour charges etc complete						
	6mm thk liner for piles						
		9.000	5.000				45.000
	Total						**45.000**
						Total Quantity in metre	**45.000**
2.003	OD1325/2022-2023						
	Supply, Fitting and Placing in position reinforcement in cages using HCR bar Reinforcement including cost of materials, labour charges, conveyance and placing the cages in bore holes providing precast cover blocks etc, complete as per Drawing and Technical Specificationsand as directed by Engineer in charge excluding cost of welding charges. Unit = 1 MT Taking output = 1 MT a) Material						
	for pile						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	pile 80kg/m3	9.000	25.000	3.140	0.600	0.080000	33.912
	pile cap 120kg/m3	1.000	6.400	6.400	0.750	0.120000	3.686
	rounding	1.000	0.967				0.967
	Total						**38.565**
						Total Quantity in tonne	**38.565**
2.004	12.23.3						
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm						
	Piles						
		9.000	25.000				225.000
	Total						**225.000**
						Total Quantity in metre	**225.000**
3	Construction of Sump						
3.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	sump						
		1.000	6.600	6.600	1.500		65.340
	Total						**65.340**
						Total Quantity in cum	**65.340**
3.002	60.7.4						
	DR PACKING FOR APRONS - Rough stone dry packing for apron with good quality blasted rubble including packing to compactness to lines levels, cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site						
	sump						
		1.000	6.600	6.600	0.450		19.602
	Total						**19.602**
						Total Quantity in cum	**19.602**
3.003	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	for sump						
	foundation	1.000	6.600	6.600	0.150		6.534

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**6.534**
						Total Quantity in cum	**6.534**
3.004	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	for sump						
	base slab	4.000	6.600		0.150		3.960
	Total						**3.960**
						Total Quantity in sqm	**3.960**
3.005	5.9.2						
	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.						
	for sump						
	side wall inner	4.000	5.600		2.000		44.800
	side wall inner	4.000	2.700		2.000		21.600
	side wall outer	8.000	2.700		2.000		43.200
	side wall edges	8.000	1.000		2.000		16.000
	Total						**125.600**
						Total Quantity in sqm	**125.600**
3.006	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	for sump						
	covering slab	2.000	6.300	2.700			34.020
	Total						**34.020**
						Total Quantity in sqm	**34.020**
3.007	5.1.2						
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size						
	for sump						
	bed slab	1.000	6.300	6.300	0.200		7.938
	rounding	1.000	0.062				0.062
	Total						**8.000**
						Total Quantity in cum	**8.000**
3.008	5.2.2						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)						
	for sump						
	Side walls	8.000	2.700	0.200	2.000		8.640
	do-projections	8.000	0.350	0.350	2.000		1.960
	Side wall inner	1.000	5.600	0.200	2.000		2.240
	rounding	1.000	0.160				0.160
	Total						**13.000**
						Total Quantity in cum	**13.000**
3.009	5.3						
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).						
	for sump						
	covering slab	1.000	6.300	6.300	0.150		5.954
	rounding	1.000	0.046				0.046
	Total						**6.000**
						Total Quantity in cum	**6.000**
3.010	5.22.1						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelMild steel and Medium Tensile steel bars						
	for sump						
	For bed slab-80kg/m3	1.000	8.000			80.000000	640.000
	Total						**640.000**
						Total Quantity in kg	**640.000**
3.011	5.22A.1						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Mild steel and Medium Tensile steel bars						
	for sump						
	For side wall-120kg/m3	1.000	13.000			120.000000	1560.000
	For covering slab-100kg/m3	1.000	6.000			100.000000	600.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**2160.000**
						Total Quantity in kilogram	**2160.000**
3.012	50.13.1						
	9 mm cement plastering of mix : 1:3 (1 cement : 3 fine sand) including all cost of materials, labour charges etc complete						
	for sump						
	side walls outside	8.000	2.700		2.000		43.200
	do-projections	8.000	1.000		2.000		16.000
	Total						**59.200**
						Total Quantity in sqm	**59.200**
3.013	13.9.1						
	Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster						
	for sump						
	side walls inside	4.000	5.600		2.000		44.800
	side walls inside	4.000	2.700		2.000		21.600
	Total						**66.400**
						Total Quantity in sqm	**66.400**
3.014	50.18.9.19.2						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 m dia 4 Kgf/cm2 - External work - Exposed on wall						
	for sump						
		1.000	10.000				10.000
	Total						**10.000**
						Total Quantity in metre	**10.000**
3.015	50.18.9.8.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2						
	for sump						
		1.000	50.000				50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
3.016	50.18.9.18.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for sump						
		1.000	50.000				50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
3.017	50.18.7.6.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing . This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 6 Kgf/cm2 - Internal work- Exposed on wall						
	for sump						
		1.000	20.000				20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
3.018	50.18.9.6.2						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2						
	for sump						
		1.000	20.000				20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
3.019	50.18.9.21.4						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend						
	for sump						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
3.020	50.18.9.21.5						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee						
	for sump						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
3.021	50.18.9.21.8						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75 mm dia End cap						
	for sump						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
3.022	50.18.9.21.9						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling						
	for sump						
		2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
3.023	18.37.1						
	Constructing masonry chamber 60x45x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for water meter complete with C.I double flap surface box 400x200x200 mm (inside) with locking arrangement and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 grades stone aggregate 20 nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S. (non modular) bricks of class designation 7.5						
	Inspection Chamber						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
3.024	18.60.1						
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore						
	water meter						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Water Supply Arrangements in the Harbour-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Construction of OH RCC Water Tank and Pump House**			
1.001	2.31			
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared			
	Net Total	400.000sqm	@14.48/sqm	5792.00
1.002	OD1292/2022-2023			
	Chipping and removing top of RCC piles to lines and levels carefully without damaging remaining portion of pile and removing debris upto a distance of 150 m including all labour charges , hire of equipments etc.complete as per directions of departmental officers at site Unit- cum Taking output - 1.25 cum			
	Net Total	2.543cum	@3537.94/cum	8996.98
1.003	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	65.340cum	@210.02/cum	13722.71
1.004	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	6.534cum	@6687.21/cum	43694.23
1.005	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	33.074cum	@9237.20/cum	305511.15
1.006	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content			

Sl No	Specification	Quantity	Rate	Amount
	as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	88.000cum	@10858.36/cum	955535.68
1.007	5.34.1			
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	121.074cum	@80.55/cum	9752.51
1.008	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	38.280sqm	@329.03/sqm	12595.27
1.009	OD5503/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - HCR Fe-500D or more			
	Net Total	13858.800kg	@96.62/kg	1339037.26
1.010	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	179.280sqm	@847.44/sqm	151929.04
1.011	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	200.160sqm	@800.47/sqm	160222.08
1.012	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	133.770sqm	@637.63/sqm	85295.77
1.013	50.6.7.2			
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.			
	Net Total	12.900cum	@7872.96/cum	101561.18
1.014	9.143			
	Providing and fixing factory made uPVC door frame, made of uPVC extruded			

Sl No	Specification	Quantity	Rate	Amount
	section, of size 65 mm x 55 mm with wall thickness 2.0 mm (? 0.2mm), corners of the door frame to be mitred cut and jointed with plastic brackets and stainless steel screws, reinforcing hinge side vertical of the frames with PVC profile of Size 28 mm x 30 mm having wall thickness 2 mm (? 0.2 mm), including providing & fixing 3 nos of 125 mm long stainless steel hinges to the frame, fixing the frame with jamb with required number & size of anchor dash fastners, all complete as per manufacturer's specification and direction of Engineer-in-charge.			
	Net Total	6.500metre	@610.23/metre	3966.50
1.015	9.142.2			
	35 mm thick factory made Solid panel PVC Door shutter, made out of single piece extruded solid PVC (±0.2 mm) thick, having styles & rails (except lock rail) of size 95 mmx 35 mm x 5 mm, out of which 75 mm shall be flat and 20 mm shall be tapered (on both side), having one side thickness of 15 mm integrally extruded on the hinges side of the profile for better screw holding power, including reinforcing with MS tube of size 40 mm x 20 mm x 1 mm, joints of styles & rails to be mitered cut & joint with the help of PVC solvent cement, self driven self tapping screws & M.S. rectangular pipes bracket of size 190 mm x 100 mm of cross section size 35 mm x 17 mm s 1 mm at each corner. Single piece extruded 5 mm thick solid PVC Lock rail of size 115 mm x 35 mm x 35 mm, out of which 95 mm to be flat and 20 mm to be tapered at both ends, having 15 mm solid core in middle of rail section integrally extruded, fixing the styles & rails with the help of solvent and self driven self tapping screws of 125 mm x 11 mm, including providing 5 mm Single piece solid PVC extruded sheet inserted in the door as panel, all complete as per manufacturer's specification and direction of Engineer-in-charge.Decorative finish (wood grained finish)			
	Net Total	2.100sqm	@4438.67/sqm	9321.21
1.016	9.147.5			
	Providing and fixing factory made uPVC white colour casement/casement cum fixed glazed windows comprising of uPVC multi-chambered frame, sash and mullion (where ever required) extruded profiles duly reinforced with 1.60 +/- 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), uPVC extruded glazing beads of appropriate dimension, EPDM gasket, stainless steel (SS 304 grade) friction hinges, zinc alloy (white powder coated) casement handles, G.I fasteners 100 x 8 mm size for fixing frame to finished wall, plastic packers, plastic caps and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, mullion (if required) shall be also fusion welded including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, all complete as per approved drawing & direction of Engineer-in-Charge. (Single / double glass panes and silicon sealant shall be paid separately) Note: For uPVC frame, sash and mullion extruded profiles minus 5% tolerance in dimension i.e. in depth & width of profile shall be acceptable.Casement window double panels with S.S. friction hinges (350 x 19 x 1.9 mm) made of (big series)frame 67 x 60 mm & sash / mullion 67 x 80 mm both having wall thickness of 2.3 ± 0.2 mm and single glazing bead/ double glazing bead of appropriate dimension. (Area of window above 1.50 sqm).			
	Net Total	3.000sqm	@11164.86/sqm	33494.58

Sl No	Specification	Quantity	Rate	Amount
1.017	9.7.7.1			
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick: Float glass panes4 mm thick glass pane			
	Net Total	2.240sqm	@2070.48/sqm	4637.88
1.018	9.100.2			
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm			
	Net Total	2.000no	@61.02/no	122.04
1.019	9.97.3			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm			
	Net Total	4.000no	@103.95/no	415.80
1.020	50.9.15.2			
	Supplying and fixing 300 mm Aluminium aldrop			
	Net Total	1.000no	@188.93/no	188.93
1.021	13.7.2			
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	577.730sqm	@379.14/sqm	219040.55
1.022	13.15			
	20 mm cement plaster 1:2 (1 cement : 2 stone dust)			
	Net Total	3.000sqm	@476.55/sqm	1429.65
1.023	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	151.640sqm	@262.57/sqm	39816.11
1.024	10.25.2			
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works			
	Net Total	4000.000kg	@151.29/kg	605160.00
1.025	13.43.1			
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	729.370sqm	@69.33/sqm	50567.22
1.026	13.60.1			
	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade:Two or more coats on new work			
	Net Total	729.370sqm	@148.59/sqm	108377.09
1.027	50.18.9.9.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2			
	Net Total	150.000metre	@521.14/metre	78171.00
1.028	50.18.8.8.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 75 mm pipe 6 Kgf/cm2			
	Net Total	20.000metre	@614.17/metre	12283.40
1.029	18.17.5			
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :65 mm nominal bore			
	Net Total	5.000each	@1718.82/each	8594.10
1.030	50.18.9.8.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2			
	Net Total	1000.000metre	@356.56/metre	356560.00
1.031	50.18.7.4.2			
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall			
	Net Total	750.000metre	@295.71/metre	221782.50
1.032	18.17.2			
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :32 mm nominal bore			
	Net Total	10.000each	@671.37/each	6713.70
1.033	18.32.1			
	Constructing masonry chamber 30x30x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for stop cock, with C.I. surface box 100x100x75 mm (inside) with hinged cover fixed in cement concrete slab 1:2:4 mix (1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm			

Sl No	Specification	Quantity	Rate	Amount
	nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S (non modular) bricks of class designation 7.5			
	Net Total	3.000each	@1827.73/each	5483.19
1.034	50.18.9.21.4			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend			
	Net Total	10.000no	@87.89/no	878.90
1.035	50.18.9.21.9			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling			
	Net Total	5.000no	@72.21/no	361.05
1.036	18.59.2			
	Providing and fixing C.I double acting air valve of approved quality with bolts, nuts, rubber insertion etc. complete (The tail pieces, tapers etc. if required will be paid separately):80 mm dia			
	Net Total	3.000no	@7208.30/no	21624.90
1.037	50.18.9.6.2			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2			
	Net Total	100.000metre	@240.68/metre	24068.00
1.038	50.18.9.21			
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Elbow			
	Net Total	10.000no	@94.28/no	942.80
1.039	50.18.9.21.5			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee			
	Net Total	10.000no	@94.65/no	946.50
1.040	18.15.2			
	Providing and fixing brass bib cock of approved quality :20 mm nominal bore			
	Net Total	20.000each	@377.04/each	7540.80
1.041	18.60.1			
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore			
	Net Total	1.000each	@4130.60/each	4130.60
			Heading Total(Rs)	5020264.86

Sl No	Specification	Quantity	Rate	Amount
2	**Pile liners and miscellaneous items for piling**			
2.001	12.22			
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.			
	Net Total	4.033MT	@125636.20/MT	506690.79
2.002	OD1321/2022-2023			
	Driving down vertically M.s Liner already fabricated to the required depth by power winch and accessories including all hire charge of machinery , labour charges etc complete			
	Net Total	45.000metre	@568.30/metre	25573.50
2.003	OD1325/2022-2023			
	Supply, Fitting and Placing in position reinforcement in cages using HCR bar Reinforcement including cost of materials, labour charges, conveyance and placing the cages in bore holes providing precast cover blocks etc, complete as per Drawing and Technical Specificationsand as directed by Engineer in charge excluding cost of welding charges. Unit = 1 MT Taking output = 1 MT a) Material			
	Net Total	38.565tonne	@98321.63/tonne	3791773.66
2.004	12.23.3			
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm			
	Net Total	225.000metre	@7210.41/metre	1622342.25
			Heading Total(Rs)	5946380.20
3	**Construction of Sump**			
3.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	65.340cum	@210.02/cum	13722.71
3.002	60.7.4			
	DR PACKING FOR APRONS - Rough stone dry packing for apron with good quality blasted rubble including packing to compactness to lines levels, cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site			
	Net Total	19.602cum	@3557.50/cum	69734.12
3.003	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4			

Sl No	Specification	Quantity	Rate	Amount
	coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	6.534cum	@6687.21/cum	43694.23
3.004	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	3.960sqm	@329.03/sqm	1302.96
3.005	5.9.2			
	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.			
	Net Total	125.600sqm	@703.77/sqm	88393.51
3.006	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	34.020sqm	@800.47/sqm	27231.99
3.007	5.1.2			
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size			
	Net Total	8.000cum	@8914.94/cum	71319.52
3.008	5.2.2			
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)			
	Net Total	13.000cum	@10748.82/cum	139734.66
3.009	5.3			
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).			
	Net Total	6.000cum	@11277.61/cum	67665.66
3.010	5.22.1			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelMild steel and Medium Tensile steel bars			
	Net Total	640.000kg	@94.84/kg	60697.60
3.011	5.22A.1			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Mild steel and Medium			

Sl No	Specification	Quantity	Rate	Amount
	Tensile steel bars			
	Net Total	2160.000kilogram	@94.84/kilogram	204854.40
3.012	50.13.1			
	9 mm cement plastering of mix : 1:3 (1 cement : 3 fine sand) including all cost of materials, labour charges etc complete			
	Net Total	59.200sqm	@285.84/sqm	16921.73
3.013	13.9.1			
	Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster			
	Net Total	66.400sqm	@404.42/sqm	26853.49
3.014	50.18.9.19.2			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 m dia 4 Kgf/cm2 - External work - Exposed on wall			
	Net Total	10.000metre	@329.39/metre	3293.90
3.015	50.18.9.8.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2			
	Net Total	50.000metre	@356.56/metre	17828.00
3.016	50.18.9.18.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall			
	Net Total	50.000metre	@279.39/metre	13969.50
3.017	50.18.7.6.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing . This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 6 Kgf/cm2 - Internal work- Exposed on wall			
	Net Total	20.000metre	@369.84/metre	7396.80
3.018	50.18.9.6.2			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2			
	Net Total	20.000metre	@240.68/metre	4813.60
3.019	50.18.9.21.4			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	5.000no	@87.89/no	439.45
3.020	50.18.9.21.5			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee			
	Net Total	5.000no	@94.65/no	473.25
3.021	50.18.9.21.8			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75 mm dia End cap			
	Net Total	1.000no	@64.08/no	64.08
3.022	50.18.9.21.9			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling			
	Net Total	2.000no	@72.21/no	144.42
3.023	18.37.1			
	Constructing masonry chamber 60x45x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for water meter complete with C.I double flap surface box 400x200x200 mm (inside) with locking arrangement and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 grades stone aggregate 20 nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S. (non modular) bricks of class designation 7.5			
	Net Total	1.000each	@9587.28/each	9587.28
3.024	18.60.1			
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore			
	Net Total	1.000each	@4130.60/each	4130.60
			Heading Total(Rs)	894267.46
			Total Estimation PAC	11860912.52

Sl No	Description	Percentage/LS	Amount
4	**Lumsum Heading**		
4.001	LS provision for part TS		
	0.00	0.00%	2000000.00
4.002	Water connection charges (KWA)		
	0.00	0.00%	1000000.00
4.003	LS Amount for Electrification		
	0.00	0.00%	1900000.00
		Total Lumsum Amount	4900000.00

Sl No	Specification	Quantity	Rate	Amount
5	**Extra Charges**			
4.001	Provision for GST			
		11860912.52	18.00%	2134964.25
			Grand Total	18895876.77
			Round off	4123.23
			Rounded Total(Rs)	18900000.00
	Rupees One Crore Eighty Nine Lakh			

ePRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Water Supply Arrangements in the Harbour-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Construction of OH RCC Water Tank and Pump House						
1.001	2.31						
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared						
	site clearance						
		1.000	20.000	20.000			400.000
	Total						**400.000**
						Total Quantity in sqm	**400.000**
1.002	OD1292/2022-2023						
	Chipping and removing top of RCC piles to lines and levels carefully without damaging remaining portion of pile and removing debris upto a distance of 150 m including all labour charges , hire of equipments etc.complete as per directions of departmental officers at site Unit- cum Taking output - 1.25 cum						
	for pile						
		9.000	3.140/4	.6*.6	1.000	1.000000	2.543
	Total						**2.543**
						Total Quantity in cum	**2.543**
1.003	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	for pile cap						
		1.000	6.600	6.600	1.500		65.340
	Total						**65.340**
						Total Quantity in cum	**65.340**
1.004	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	for pile pcc						
		1.000	6.600	6.600	0.150		6.534
	Total						**6.534**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**6.534**
1.005	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	column upto GL and footing						
	column upto GL	9.000	0.600	0.600	0.700		2.268
	Raft	1.000	6.400	6.400	0.750		30.720
	rounding	1.000	0.086				0.086
	Total						**33.074**
						Total Quantity in cum	**33.074**
1.006	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	columns and walls						
	column from GL to top	9.000	0.400	0.400	12.450		17.928
	Wall of water tank	2.000	6.000	0.250	3.000		9.000
		2.000	5.600	0.250	3.000		8.400
	rounding	1.000	2.672				2.672
	Total						**38.000**
	Beams and slab						
	tie beams	12*3	2.400	0.300	0.300		7.776
	haunch	24*3	0.300	0.300	0.300		1.944
	bottom slab for tank	1.000	7.600	7.600	0.250		14.440
	bottom beam for slab	3.000	6.000	0.300	0.300		1.620
		3.000	5.100	0.300	0.300		1.377

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	top slab cover	1.000	6.000	6.000	0.120		4.320
	slab on GF	1.000	7.600	7.600	0.150		8.664
	slab projections	2*4	7.600	0.800	0.150		7.296
	lintel GF	1.000	6.000	0.200	0.200		0.240
	sunshade GF	1.000	6.000	0.600	0.100		0.360
	rounding	1.000	1.963				1.963
	Total						**50.000**
						Total Quantity in cum	**88.000**
1.007	5.34.1						
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	column upto GL and footing						
	column upto GL	9.000	0.600	0.600	0.700		2.268
	Raft	1.000	6.400	6.400	0.750		30.720
	rounding	1.000	0.086				0.086
	Total						**33.074**
	columns and walls						
	column from GL to top	9.000	0.400	0.400	12.450		17.928
	Wall of water tank	2.000	6.000	0.250	3.000		9.000
		2.000	5.600	0.250	3.000		8.400
	rounding	1.000	2.672				2.672
	Total						**38.000**
	Beams and slab						
	tie beams	12*3	2.400	0.300	0.300		7.776
	haunch	24*3	0.300	0.300	0.300		1.944
	bottom slab for tank	1.000	7.600	7.600	0.250		14.440
	bottom beam for slab	3.000	6.000	0.300	0.300		1.620
		3.000	5.100	0.300	0.300		1.377
	top slab cover	1.000	6.000	6.000	0.120		4.320
	slab on GF	1.000	7.600	7.600	0.150		8.664
	slab projections	2*4	7.600	0.800	0.150		7.296
	lintel GF	1.000	6.000	0.200	0.200		0.240
	sunshade GF	1.000	6.000	0.600	0.100		0.360

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	1.963				1.963
	Total						**50.000**
						Total Quantity in cum	**121.074**
1.008	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	for pile cap						
	for pcc	4.000	6.600		0.150		3.960
	for pile cap	4.000	6.400		0.750		19.200
	column upto GL	9.000	2.400		0.700		15.120
	Total						**38.280**
						Total Quantity in sqm	**38.280**
1.009	OD5503/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - HCR Fe-500D or more						
	Reinforcement						
		1.000	38.000			120.000000	4560.000
		1.000	50.000			120.000000	6000.000
	Total						**10560.000**
	column						
	column upto GL	9.000	0.600	0.600	0.700	100.000000	226.800
	Raft	1.000	6.400	6.400	0.750	100.000000	3072.000
	Total						**3298.800**
						Total Quantity in kg	**13858.800**
1.010	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	column						
		9.000	1.600		12.450		179.280
	Total						**179.280**
						Total Quantity in sqm	**179.280**
1.011	5.9.3						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	slabs						
	bottom slab for tank	1.000	7.600	7.600			57.760
	top slab cover	1.000	6.000	6.000			36.000
	slab on GF	1.000	7.600	7.600			57.760
	slab projections	2*4	7.600	0.800			48.640
	Total						**200.160**
						Total Quantity in sqm	**200.160**
1.012	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	beams						
	tie beams	12*3	2.400	0.900			77.760
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	lintel GF	1.000	6.000	0.400			2.400
	Sunshade GF	1.000	6.000	0.700			4.200
	Total						**133.770**
						Total Quantity in sqm	**133.770**
1.013	50.6.7.2						
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.						
	Pump house at GF						
	long wall	2.000	6.000	0.200	3.000		7.200
	cross wall	2.000	5.600	0.200	3.000		6.720
	Total						**13.920**
	deduction						
	door	-1.000	1.000	0.200	2.100		-0.420
	window	-1.000	2.000	0.200	1.500		-0.600
	Total						**-1.020**
						Total Quantity in cum	**12.900**
1.014	9.143						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing factory made uPVC door frame, made of uPVC extruded section, of size 65 mm x 55 mm with wall thickness 2.0 mm (? 0.2mm), corners of the door frame to be mitred cut and jointed with plastic brackets and stainless steel screws, reinforcing hinge side vertical of the frames with PVC profile of Size 28 mm x 30 mm having wall thickness 2 mm (? 0.2 mm), including providing & fixing 3 nos of 125 mm long stainless steel hinges to the frame, fixing the frame with jamb with required number & size of anchor dash fastners, all complete as per manufacturer's specification and direction of Engineer-in-charge.						
	door						
		1.000	6.500				6.500
	Total						**6.500**
						Total Quantity in metre	**6.500**
1.015	9.142.2						
	35 mm thick factory made Solid panel PVC Door shutter, made out of single piece extruded solid PVC (±0.2 mm) thick, having styles & rails (except lock rail) of size 95 mmx 35 mm x 5 mm, out of which 75 mm shall be flat and 20 mm shall be tapered (on both side), having one side thickness of 15 mm integrally extruded on the hinges side of the profile for better screw holding power, including reinforcing with MS tube of size 40 mm x 20 mm x 1 mm, joints of styles & rails to be mitered cut & joint with the help of PVC solvent cement, self driven self tapping screws & M.S. rectangular pipes bracket of size 190 mm x 100 mm of cross section size 35 mm x 17 mm s 1 mm at each corner. Single piece extruded 5 mm thick solid PVC Lock rail of size 115 mm x 35 mm x 35 mm, out of which 95 mm to be flat and 20 mm to be tapered at both ends, having 15 mm solid core in middle of rail section integrally extruded, fixing the styles & rails with the help of solvent and self driven self tapping screws of 125 mm x 11 mm, including providing 5 mm Single piece solid PVC extruded sheet inserted in the door as panel, all complete as per manufacturer's specification and direction of Engineer-in-charge.Decorative finish (wood grained finish)						
	door						
		1.000	1.000		2.100		2.100
	Total						**2.100**
						Total Quantity in sqm	**2.100**
1.016	9.147.5						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing factory made uPVC white colour casement/casement cum fixed glazed windows comprising of uPVC multi-chambered frame, sash and mullion (where ever required) extruded profiles duly reinforced with 1.60 +/- 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), uPVC extruded glazing beads of appropriate dimension, EPDM gasket, stainless steel (SS 304 grade) friction hinges, zinc alloy (white powder coated) casement handles, G.I fasteners 100 x 8 mm size for fixing frame to finished wall, plastic packers, plastic caps and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, mullion (if required) shall be also fusion welded including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, all complete as per approved drawing & direction of Engineer-in-Charge. (Single / double glass panes and silicon sealant shall be paid separately) Note: For uPVC frame, sash and mullion extruded profiles minus 5% tolerance in dimension i.e. in depth & width of profile shall be acceptable.Casement window double panels with S.S. friction hinges (350 x 19 x 1.9 mm) made of (big series)frame 67 x 60 mm & sash / mullion 67 x 80 mm both having wall thickness of 2.3 ± 0.2 mm and single glazing bead/ double glazing bead of appropriate dimension. (Area of window above 1.50 sqm).						
	window						
		1.000	2.000		1.500		3.000
	Total						**3.000**
						Total Quantity in sqm	**3.000**
1.017	9.7.7.1						
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick: Float glass panes4 mm thick glass pane						
	window						
		4.000	0.400		1.400		2.240
	Total						**2.240**
						Total Quantity in sqm	**2.240**
1.018	9.100.2						
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm						
	door						
		2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.019	9.97.3						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm						
	door						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.020	50.9.15.2						
	Supplying and fixing 300 mm Aluminium aldrop						
	for door						
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.021	13.7.2						
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:4 (1 cement : 4 fine sand)						
	plastering						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	Total						**448.730**
	pump house						
	long wall	2*2	6.000		3.000		72.000
	cross wall	2*2	5.600		3.000		67.200
	door	-1*2	1.000		2.100		-4.200
	window	-1*2	2.000		1.500		-6.000
	Total						**129.000**
						Total Quantity in sqm	**577.730**
1.022	13.15						
	20 mm cement plaster 1:2 (1 cement : 2 stone dust)						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Inside water tank						
	Floor of slab (excluding haunch)	1.000					1.000
	Vertical sides	1.000					1.000
	Haunchings	1.000					1.000
	Total						**3.000**
						Total Quantity in sqm	**3.000**
1.023	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	ceiling						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**151.640**
1.024	10.25.2						
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works						
	For Ladder						
	Ladder for (Stage height 12.45 m)	4.000	1000.000			1.000000	4000.000
	Total						**4000.000**
						Total Quantity in kg	**4000.000**
1.025	13.43.1						
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	painting						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	pump house-long wall	2*2	6.000		3.000		72.000
	do-cross wall	2*2	5.600		3.000		67.200
	do-door	-1*2	1.000		2.100		-4.200
	do-window	-1*2	2.000		1.500		-6.000
	Total						**577.730**
	painting ceilings						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**729.370**
1.026	13.60.1						
	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade:Two or more coats on new work						
	painting						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	pump house-long wall	2*2	6.000		3.000		72.000
	do-cross wall	2*2	5.600		3.000		67.200
	do-door	-1*2	1.000		2.100		-4.200

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	do-window	-1*2	2.000		1.500		-6.000
	Total						**577.730**
	painting ceiling						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**729.370**
1.027	50.18.9.9.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2						
	pipe line						
		150.000					150.000
	Total						**150.000**
						Total Quantity in metre	**150.000**
1.028	50.18.8.8.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 75 mm pipe 6 Kgf/cm2						
	pipe line						
		20.000					20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
1.029	18.17.5						
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :65 mm nominal bore						
	for supply lines						
		5.000					5.000
	Total						**5.000**
						Total Quantity in each	**5.000**
1.030	50.18.9.8.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	supply line						
		1000.000					1000.000
	Total						**1000.000**
						Total Quantity in metre	**1000.000**
1.031	50.18.7.4.2						
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall						
	pipe line						
		1.000	750.000				750.000
	Total						**750.000**
						Total Quantity in metre	**750.000**
1.032	18.17.2						
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :32 mm nominal bore						
	for supply lines						
		10.000					10.000
	Total						**10.000**
						Total Quantity in each	**10.000**
1.033	18.32.1						
	Constructing masonry chamber 30x30x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for stop cock, with C.I. surface box 100x100x75 mm (inside) with hinged cover fixed in cement concrete slab 1:2:4 mix (1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S (non modular) bricks of class designation 7.5						
	for inspection chamber						
		3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.034	50.18.9.21.4						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend						
	bend						
		10.000					10.000
	Total						**10.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in no	**10.000**
1.035	50.18.9.21.9						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling						
	socket						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
1.036	18.59.2						
	Providing and fixing C.I double acting air valve of approved quality with bolts, nuts, rubber insertion etc. complete (The tail pieces, tapers etc. if required will be paid separately):80 mm dia						
	air valve						
		3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.037	50.18.9.6.2						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2						
	pipe line						
		100.000					100.000
	Total						**100.000**
						Total Quantity in metre	**100.000**
1.038	50.18.9.21						
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Elbow						
	elbow						
		10.000					10.000
	Total						**10.000**
						Total Quantity in no	**10.000**
1.039	50.18.9.21.5						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee						
	tee						
		10.000					10.000
	Total						**10.000**
						Total Quantity in no	**10.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.040	18.15.2						
	Providing and fixing brass bib cock of approved quality :20 mm nominal bore						
	bib cock						
		20.000					20.000
	Total						**20.000**
						Total Quantity in each	**20.000**
1.041	18.60.1						
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore						
	water meter						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
2	Pile liners and miscellaneous items for piling						
2.001	12.22						
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.						
	6 mm liner 47.1 kg/m2						
		9.000	3.14*.606	47.1/1000	5.000		4.033
	Total						**4.033**
						Total Quantity in MT	**4.033**
2.002	OD1321/2022-2023						
	Driving down vertically M.s Liner already fabricated to the required depth by power winch and accessories including all hire charge of machinery , labour charges etc complete						
	6mm thk liner for piles						
		9.000	5.000				45.000
	Total						**45.000**
						Total Quantity in metre	**45.000**
2.003	OD1325/2022-2023						
	Supply, Fitting and Placing in position reinforcement in cages using HCR bar Reinforcement including cost of materials, labour charges, conveyance and placing the cages in bore holes providing precast cover blocks etc, complete as per Drawing and Technical Specificationsand as directed by Engineer in charge excluding cost of welding charges. Unit = 1 MT Taking output = 1 MT a) Material						
	for pile						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	pile 80kg/m3	9.000	25.000	3.140	0.600	0.080000	33.912
	pile cap 120kg/m3	1.000	6.400	6.400	0.750	0.120000	3.686
	rounding	1.000	0.967				0.967
	Total						**38.565**
						Total Quantity in tonne	**38.565**
2.004	12.23.3						
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm						
	Piles						
		9.000	25.000				225.000
	Total						**225.000**
						Total Quantity in metre	**225.000**
3	Construction of Sump						
3.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	sump						
		1.000	6.600	6.600	1.500		65.340
	Total						**65.340**
						Total Quantity in cum	**65.340**
3.002	60.7.4						
	DR PACKING FOR APRONS - Rough stone dry packing for apron with good quality blasted rubble including packing to compactness to lines levels, cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site						
	sump						
		1.000	6.600	6.600	0.450		19.602
	Total						**19.602**
						Total Quantity in cum	**19.602**
3.003	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	for sump						
	foundation	1.000	6.600	6.600	0.150		6.534

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**6.534**
						Total Quantity in cum	**6.534**
3.004	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	for sump						
	base slab	4.000	6.600		0.150		3.960
	Total						**3.960**
						Total Quantity in sqm	**3.960**
3.005	5.9.2						
	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.						
	for sump						
	side wall inner	4.000	5.600		2.000		44.800
	side wall inner	4.000	2.700		2.000		21.600
	side wall outer	8.000	2.700		2.000		43.200
	side wall edges	8.000	1.000		2.000		16.000
	Total						**125.600**
						Total Quantity in sqm	**125.600**
3.006	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	for sump						
	covering slab	2.000	6.300	2.700			34.020
	Total						**34.020**
						Total Quantity in sqm	**34.020**
3.007	5.1.2						
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size						
	for sump						
	bed slab	1.000	6.300	6.300	0.200		7.938
	rounding	1.000	0.062				0.062
	Total						**8.000**
						Total Quantity in cum	**8.000**
3.008	5.2.2						

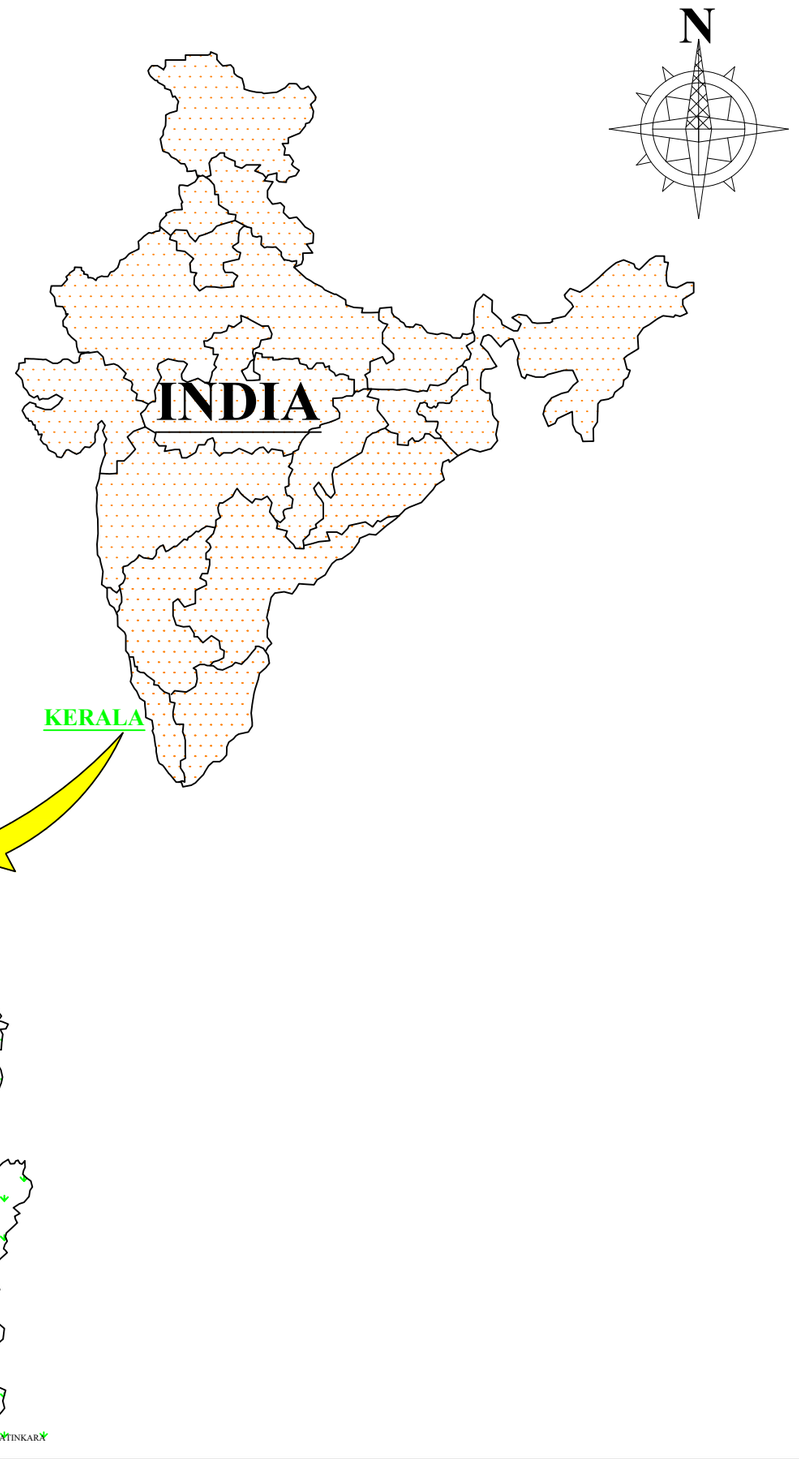
Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)						
	for sump						
	Side walls	8.000	2.700	0.200	2.000		8.640
	do-projections	8.000	0.350	0.350	2.000		1.960
	Side wall inner	1.000	5.600	0.200	2.000		2.240
	rounding	1.000	0.160				0.160
	Total						**13.000**
						Total Quantity in cum	**13.000**
3.009	5.3						
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).						
	for sump						
	covering slab	1.000	6.300	6.300	0.150		5.954
	rounding	1.000	0.046				0.046
	Total						**6.000**
						Total Quantity in cum	**6.000**
3.010	5.22.1						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelMild steel and Medium Tensile steel bars						
	for sump						
	For bed slab-80kg/m3	1.000	8.000			80.000000	640.000
	Total						**640.000**
						Total Quantity in kg	**640.000**
3.011	5.22A.1						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Mild steel and Medium Tensile steel bars						
	for sump						
	For side wall-120kg/m3	1.000	13.000			120.000000	1560.000
	For covering slab-100kg/m3	1.000	6.000			100.000000	600.000

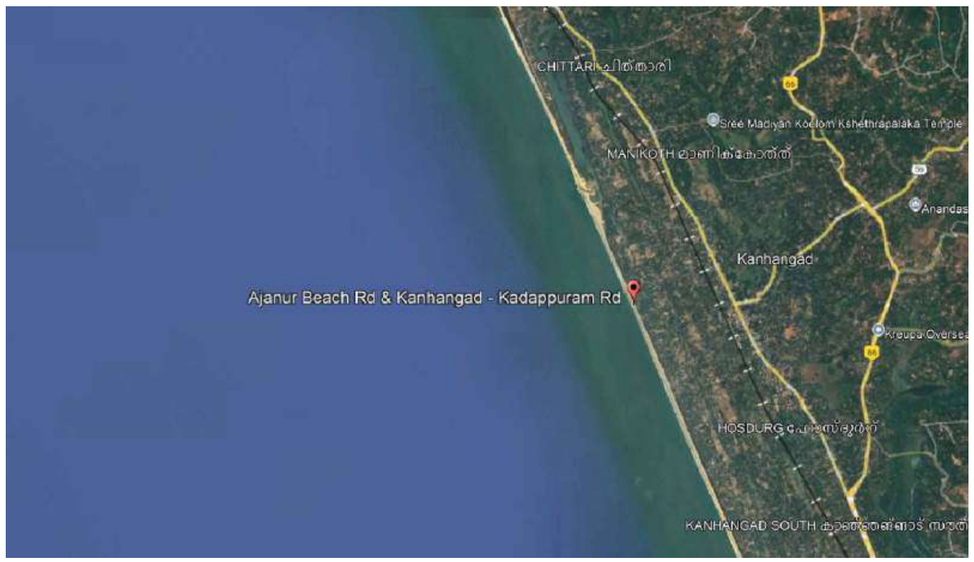
Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**2160.000**
						Total Quantity in kilogram	**2160.000**
3.012	50.13.1						
	9 mm cement plastering of mix : 1:3 (1 cement : 3 fine sand) including all cost of materials, labour charges etc complete						
	for sump						
	side walls outside	8.000	2.700		2.000		43.200
	do-projections	8.000	1.000		2.000		16.000
	Total						**59.200**
						Total Quantity in sqm	**59.200**
3.013	13.9.1						
	Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster						
	for sump						
	side walls inside	4.000	5.600		2.000		44.800
	side walls inside	4.000	2.700		2.000		21.600
	Total						**66.400**
						Total Quantity in sqm	**66.400**
3.014	50.18.9.19.2						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 m dia 4 Kgf/cm2 - External work - Exposed on wall						
	for sump						
		1.000	10.000				10.000
	Total						**10.000**
						Total Quantity in metre	**10.000**
3.015	50.18.9.8.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2						
	for sump						
		1.000	50.000				50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
3.016	50.18.9.18.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for sump						
		1.000	50.000				50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
3.017	50.18.7.6.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing . This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 6 Kgf/cm2 - Internal work- Exposed on wall						
	for sump						
		1.000	20.000				20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
3.018	50.18.9.6.2						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2						
	for sump						
		1.000	20.000				20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
3.019	50.18.9.21.4						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend						
	for sump						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
3.020	50.18.9.21.5						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee						
	for sump						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
3.021	50.18.9.21.8						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75 mm dia End cap						
	for sump						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
3.022	50.18.9.21.9						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling						
	for sump						
		2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
3.023	18.37.1						
	Constructing masonry chamber 60x45x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for water meter complete with C.I double flap surface box 400x200x200 mm (inside) with locking arrangement and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 grades stone aggregate 20 nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S. (non modular) bricks of class designation 7.5						
	Inspection Chamber						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
3.024	18.60.1						
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore						
	water meter						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**

DRAWINGS

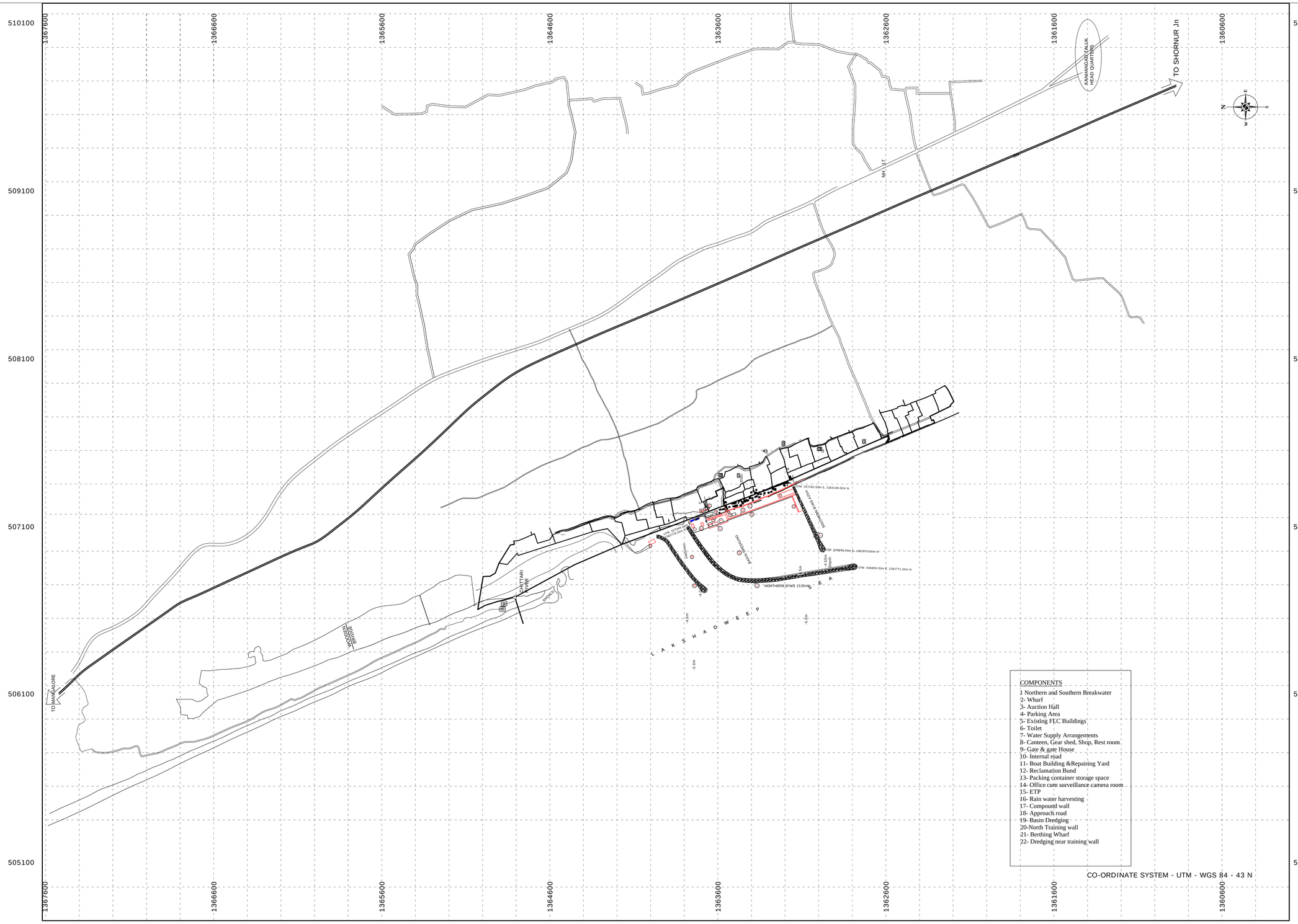




KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	01/24/AJNR	**ASSISTANT ENGINEER:** SIGNATURE:	**ASSISTANT EXECUTIVE ENGINEER:** SIGNATURE:
		DRAWN:			
TYPE:		**REVISION**		**EXECUTIVE ENGINEER:** SIGNATURE:	**SUPERINTENDING ENGINEER:** SIGNATURE: / **CHIEF ENGINEER:** SIGNATURE:
TITLE:	LOCATION MAP				



KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	2/ 24 / AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:8000		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	LAYOUT				

506100

507100

508100

1363600

1362600

N

W

E

S

LAKSHADWEEP SEA

-4.5m

-5.0m

-4.0m

DREDGING

BASIN DREDGING

1150 m

NORTHERN B/WS 1150m

-4.5m

-5.0m

-4.50m Depth

UTM: 506809.00m E, 1362771.00m N

SOUTHERN B/WS 425m

UTM: 506896.00m E, 1362970.00m N

UTM: 507045.00m E, 1363778.00m N

UTM: 507282.00m E, 1363149.00m N

Crescent school
Ajanur kadapuram

Sri Kurumba

Rahmaniya Masjid

Anganvadi

COMPONENTS

1 Northern and Southern Breakwater
2- Wharf
3- Auction Hall
4- Parking Area
5- Existing FLC Buildings
6- Toilet
7- Water Supply Arrangements
8- Canteen, Gear shed, Shop, Rest room
9- Gate & gate House
10- Internal road
11- Boat Building &Repairing Yard
12- Reclamation Bund
13- Packing container storage space
14- Office cum surveillance camera room
15- ETP
16- Rain water harvesting
17- Compound wall
18- Approach road
19- Basin Dredging
20-North Training wall
21- Berthing Wharf
22- Dredging near training wall

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	2(a)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:2500		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	PROPOSED LAYOUT				

506100

507100

508100

1363600

1362600

N

W

E

S

COMPONENTS

1 Northern and Southern Breakwater
2- Wharf
3- Auction Hall
4- Parking Area
5- Existing FLC Buildings
6- Toilet
7- Water Supply Arrangements
8- Canteen, Gear shed, Shop, Rest room
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12- Reclamation Bund
13- Packing container storage space
14- Office cum surveillance camera room
15- ETP
16- Rain water harvesting
17- Compound wall
18- Approach road
19- Basin Dredging
20-North Training wall
21- Berthing Wharf
22- Dredging near training wall

DREDGING

-4.0m

BASIN DREDGING

1150 m

NORTHERN B/WS 1150m

-4.5m

-4.50m
Depth

UTM: 506809.00m E, 1362771.00m N

UTM: 507045.00m E, 1363778.00m N

UTM: 507282.00m E, 1363149.00m N

SOUTHERN B/WS 425m

UTM: 506896.00m E, 1362970.00m N

Crescent school
Aseruf kadapuram

Sri
kurumba

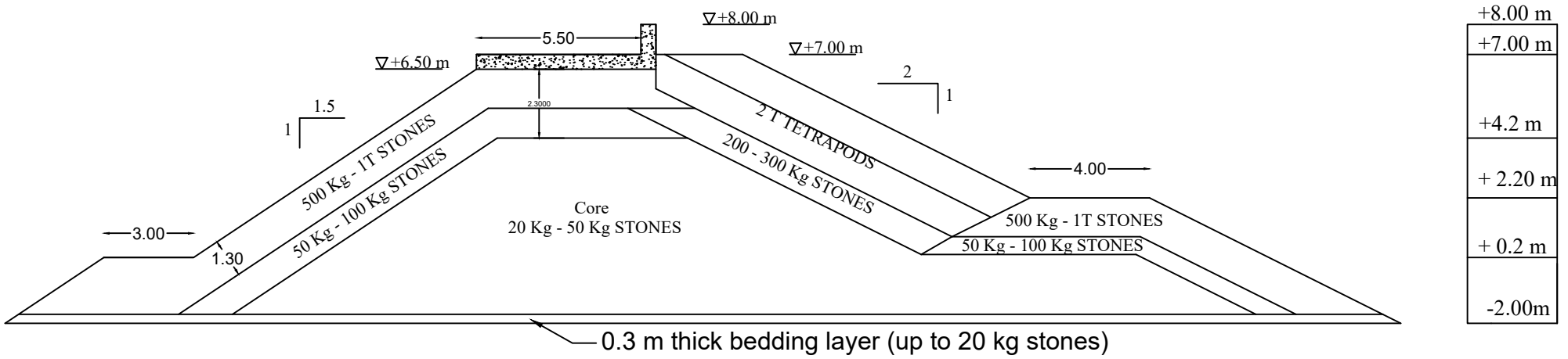
Rahmaniya
Masjid

Anganvadi

KERALA STATE HARBOUR
ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	2(b) /24/ AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
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TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	LAYOUT WITH CONTOUR				



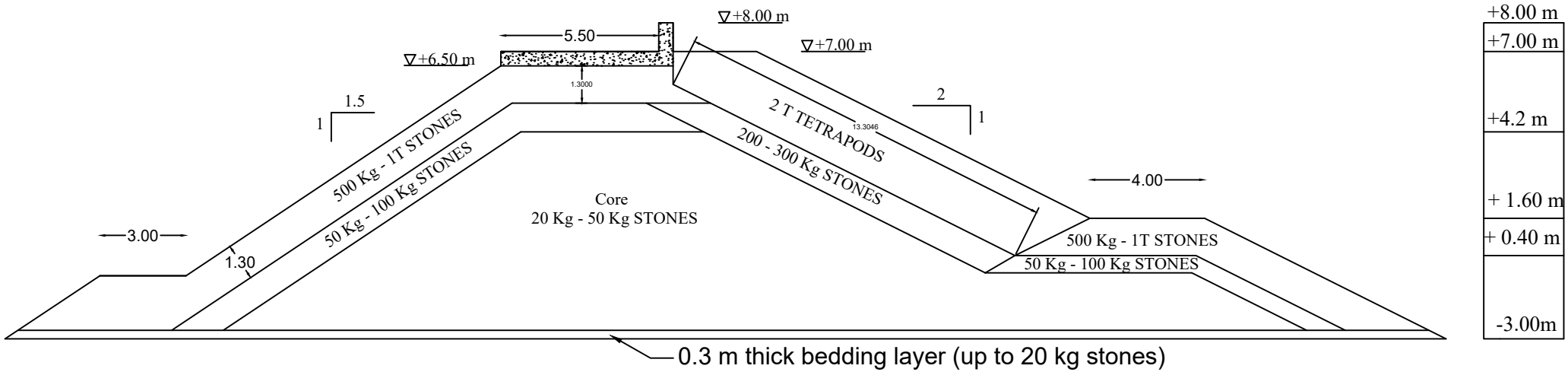
Trunk section at -2.0 m Bed Level

5 - 10kg Stones	13.84 sqm
20 - 50kg Stones	112.86 sqm
50 - 100kg Stones	24.19 sqm
200 - 300kg Stones	10.29 sqm
500 Kg - 1T Stones	47.50 sqm
2 T Tetrapods	11.07 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO:	3(a)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:200		
TYPE:	Break water and river training	REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE / CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -2.0 m bed level				



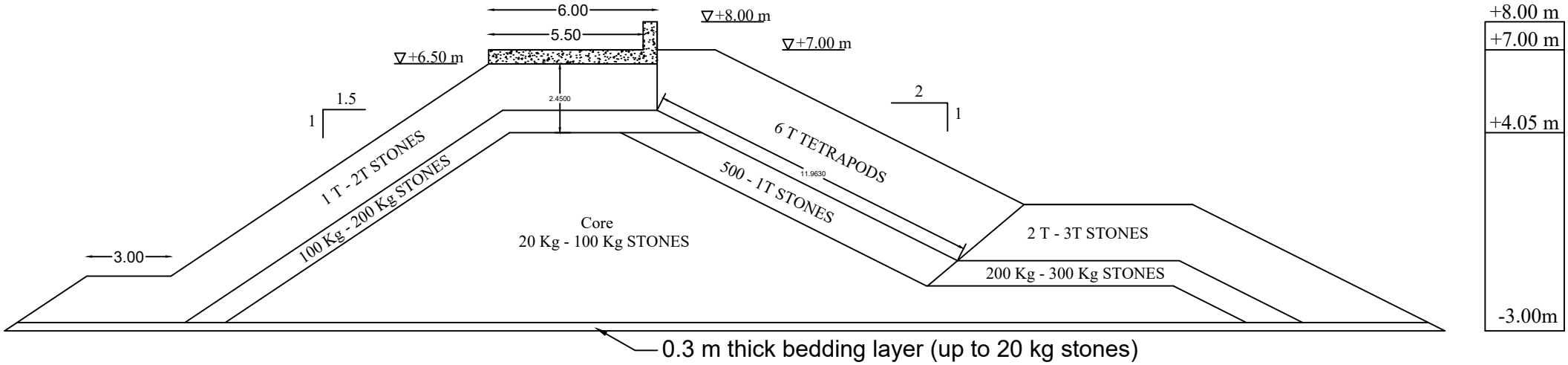
Trunk section at -3.0 m Bed Level

5 - 10kg Stones	14.89 sqm
20 - 50kg Stones	141.63 sqm
50 - 100kg Stones	25.99 sqm
200 - 300kg Stones	12.52 sqm
500 Kg - 1T Stones	49.84 sqm
2 T Tetrapods	13.30 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO:	3(b)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:200		
TYPE:	Break water and river training	REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE / CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -3.0 m bed level				



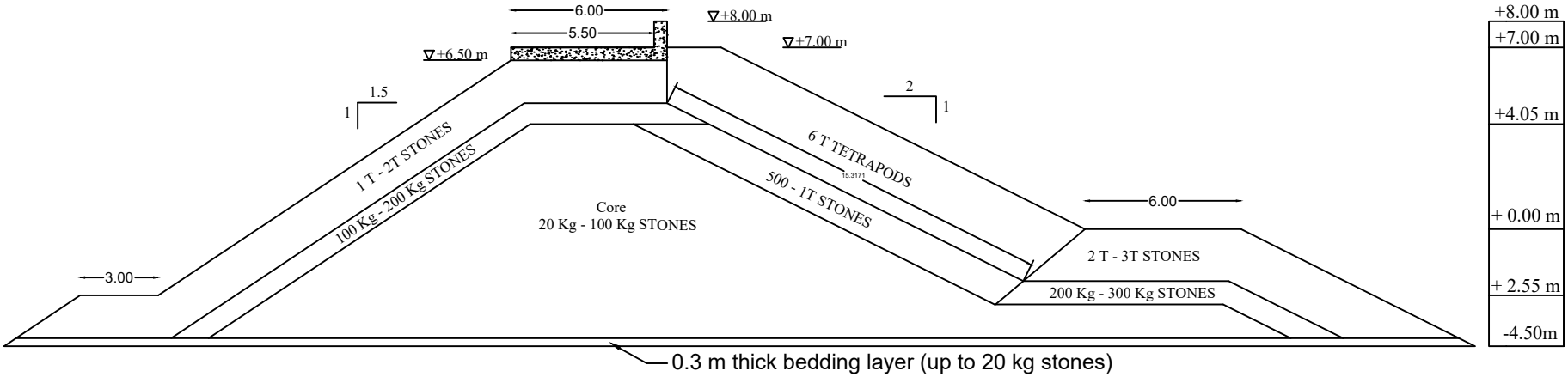
Trunk section at -3.0 m Bed Level

5 - 10kg Stones	15.24 sqm
20 - 100kg Stones	117.84 sqm
10 - 200kg Stones	15.26 sqm
200 - 300kg Stones	11.03 sqm
500 Kg - 1T Stones	14.45 sqm
1T - 2 T Stones	39.35 sqm
2T - 3 T Stones	28.21 sqm
6 T Tetrapods	12.00 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO:	3(c)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:200		
TYPE:	Break water and river training	REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE / CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -3.0 m bed level				



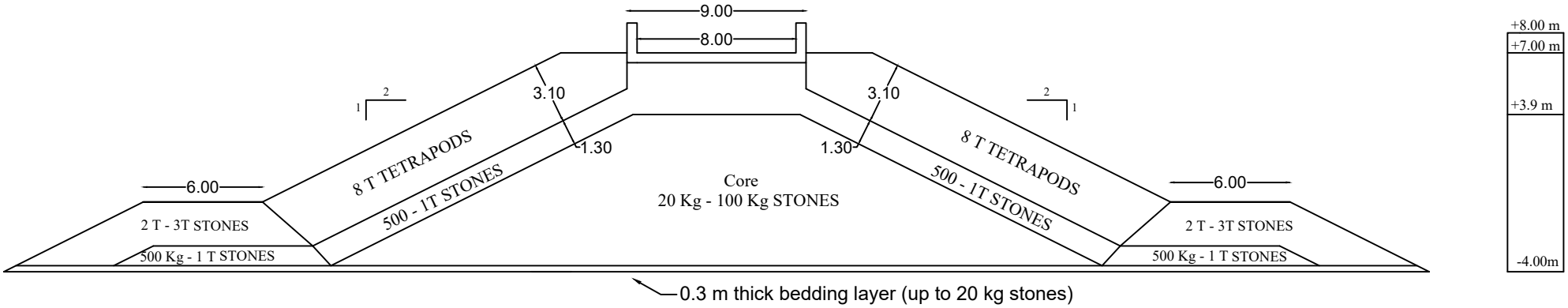
Trunk section at -4.5 m Bed Level

5 - 10kg Stones	16.81 sqm
20 - 100kg Stones	163.28 sqm
10 - 200kg Stones	17.42 sqm
200 - 300kg Stones	11.03 sqm
500 Kg - 1T Stones	18.89 sqm
1T - 2 T Stones	43.81 sqm
2T - 3 T Stones	28.21 sqm
6 T Tetrapods	15.31 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO: 3(d)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:250			
TYPE:	Break water and river training	REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -4.5 m bed level				



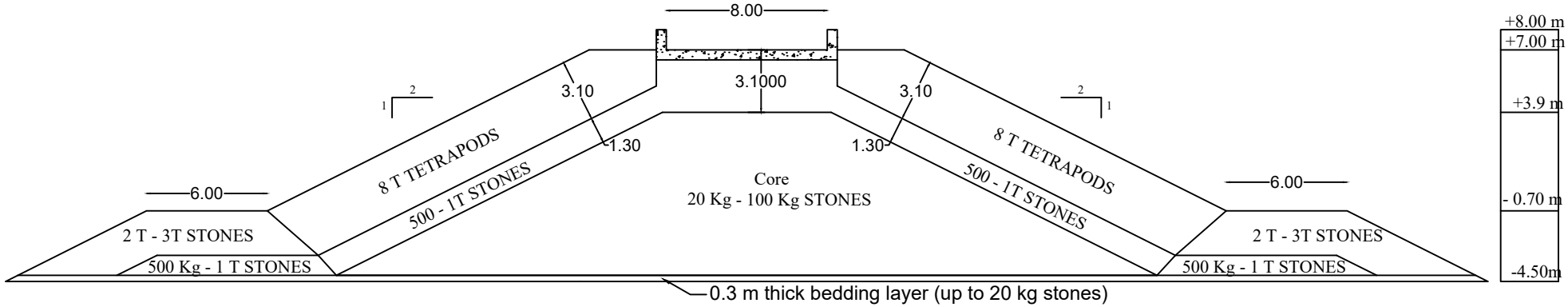
Round Head section at -4.0 m Bed Level

5 - 10kg Stones	21.32 sqm
20 - 100kg Stones	179.26 sqm
500 Kg - 1T Stones	86.99 sqm
2T - 3 T Stones	51.48 sqm
8 T Tetrapods	17.66 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO: 3(e)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:300			
TYPE:	Break water and river training	REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -4.0 m bed level				



Round Head section at -4.5 m Bed Level

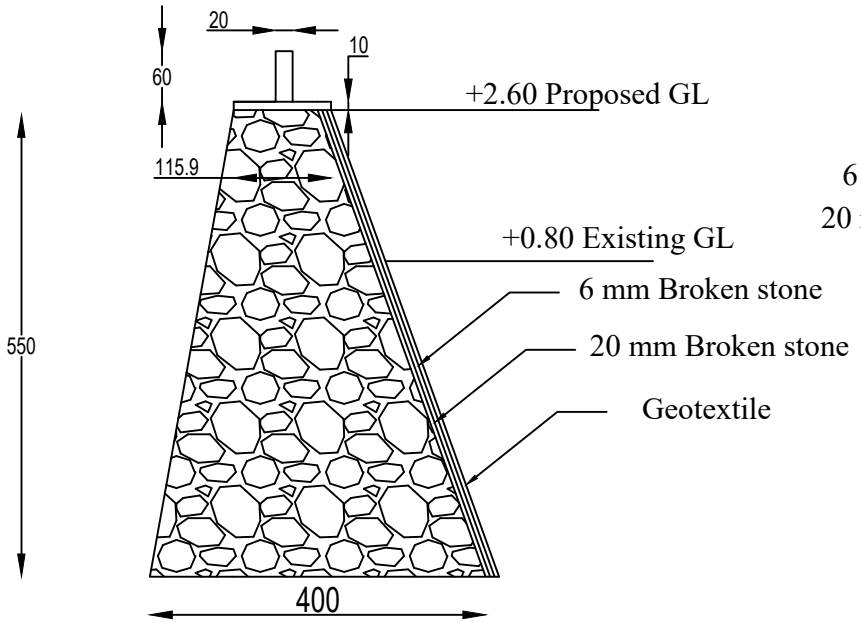
5 - 10kg Stones	21.92 sqm
20 - 100kg Stones	199.15 sqm
500 Kg - 1T Stones	89.90 sqm
2-3 T Stones	51.48 sqm
8 T Tetrapods	20.19 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

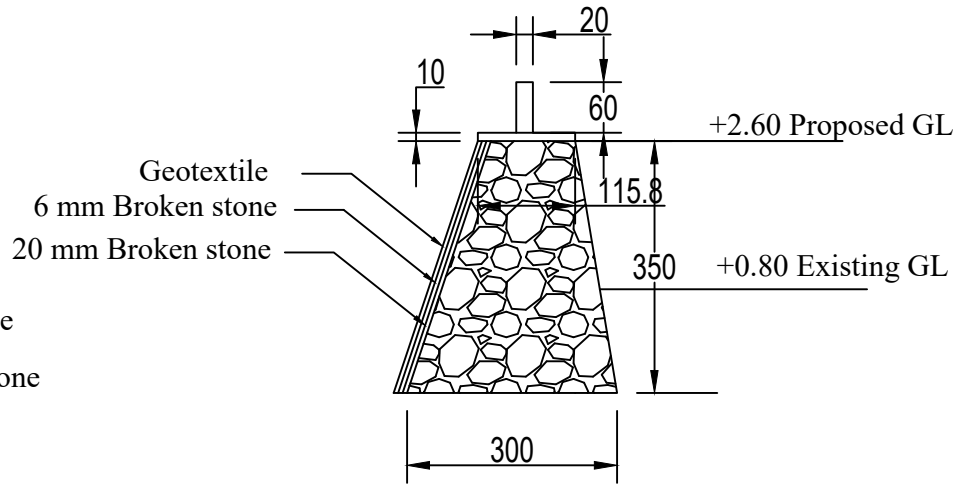
NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO: 3(f)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:300			
TYPE:	Break water and river training	REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -4.5 m bed level				

CROSS SECTION OF RECLAMATION BUND ALONG THE BASIN



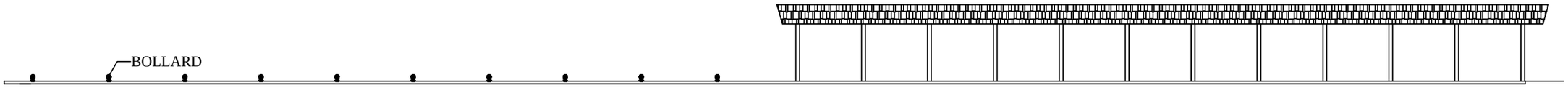
CROSS SECTION OF RECLAMATION BUND NEAR THE RIVER TRAINING AREA



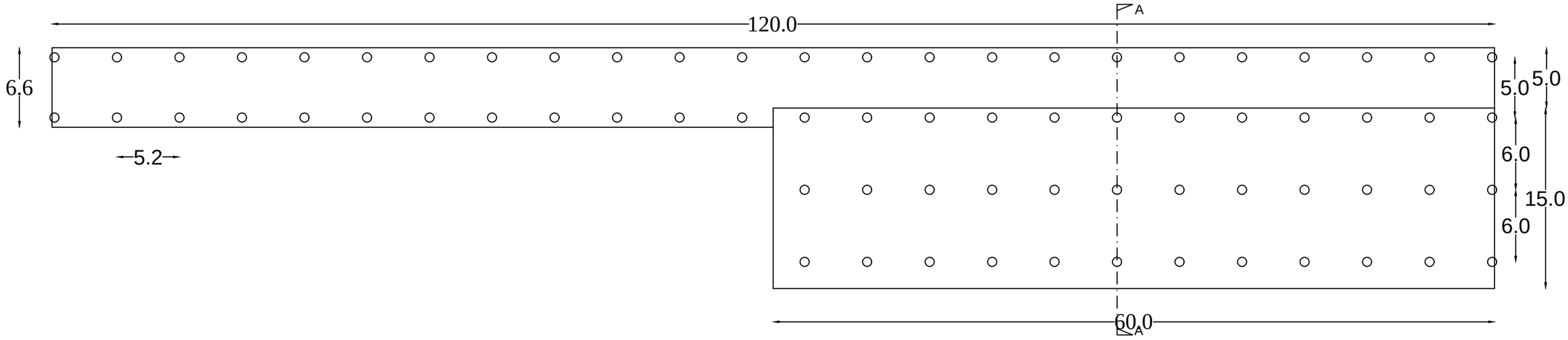
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO: 04/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:90			
TYPE:		REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	
TITLE:	DREDGING AND CONSTRUCTION OF RECLAMATION BUND				



FRONT ELEVATION

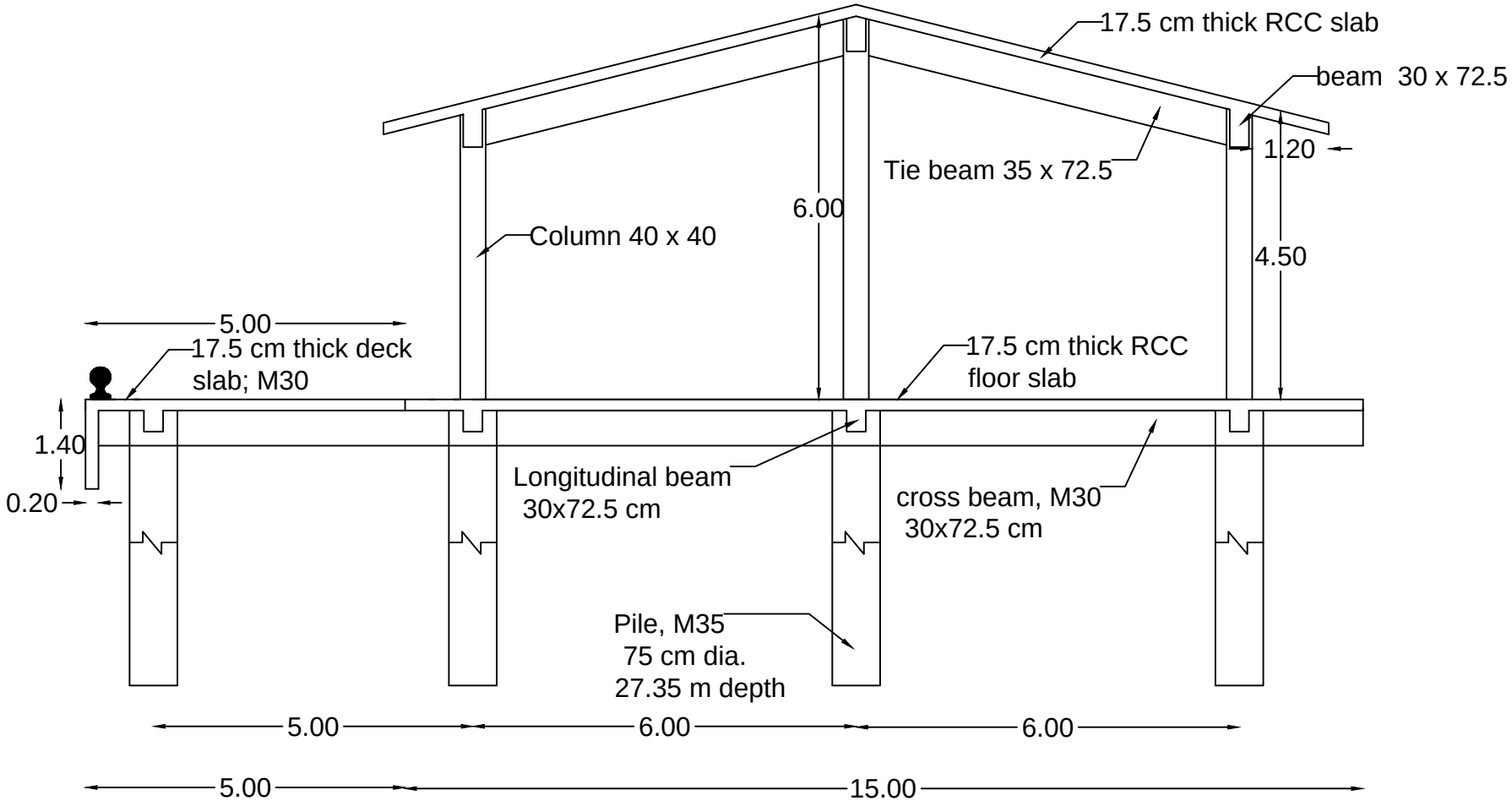


PLAN OF HARBOUR

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	5(a) /24 /AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		DRAWN:	1:350		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	WHARF AND AUCTION HALL				

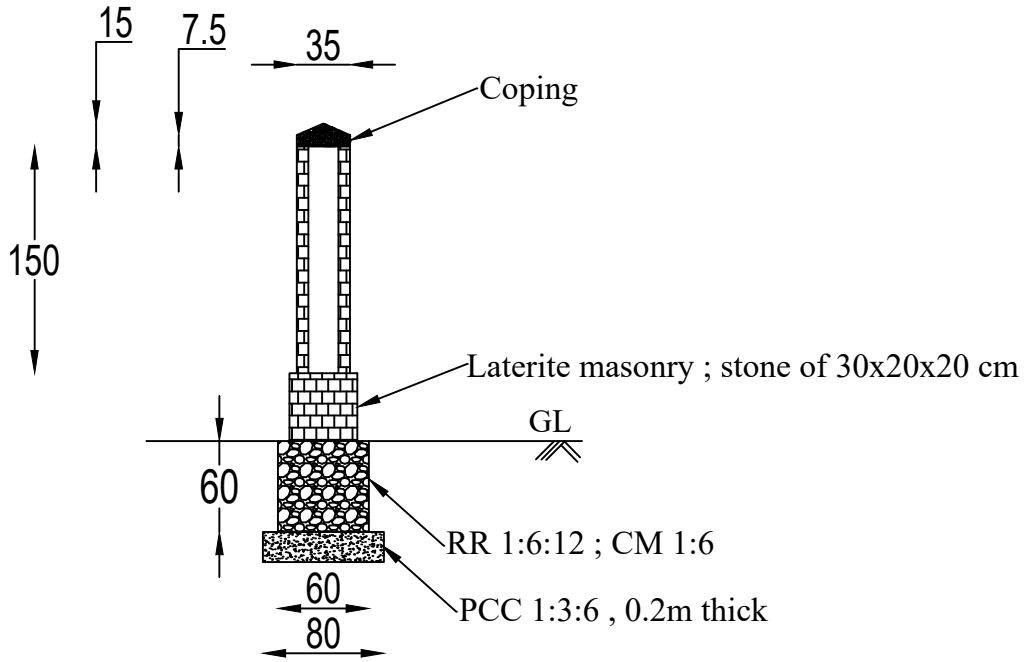


SECTION AA

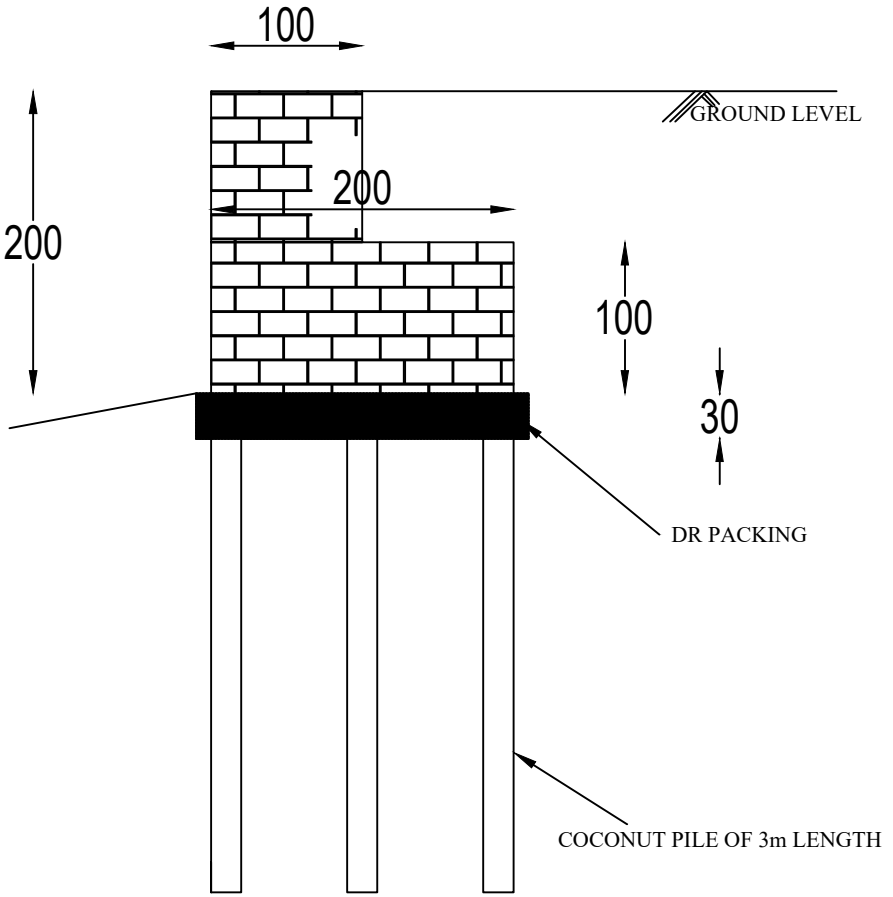
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	5(b) /24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		DRAWN:	1:100		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	WHARF AND AUCTION HALL				



CROSS SECTION OF COMPOUND WALL

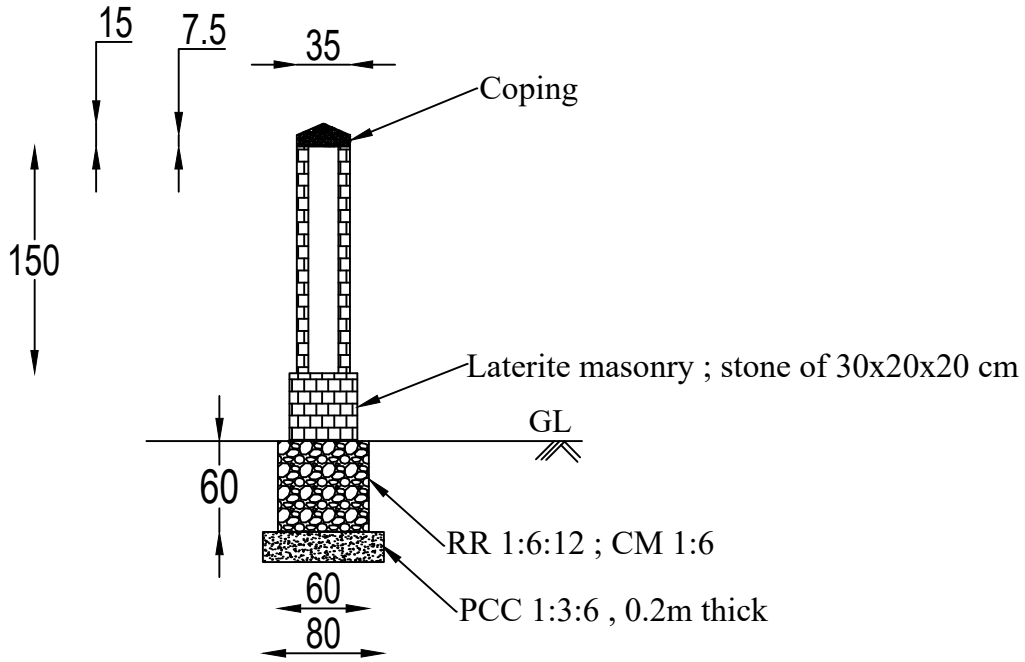


SIDE PROTECTION

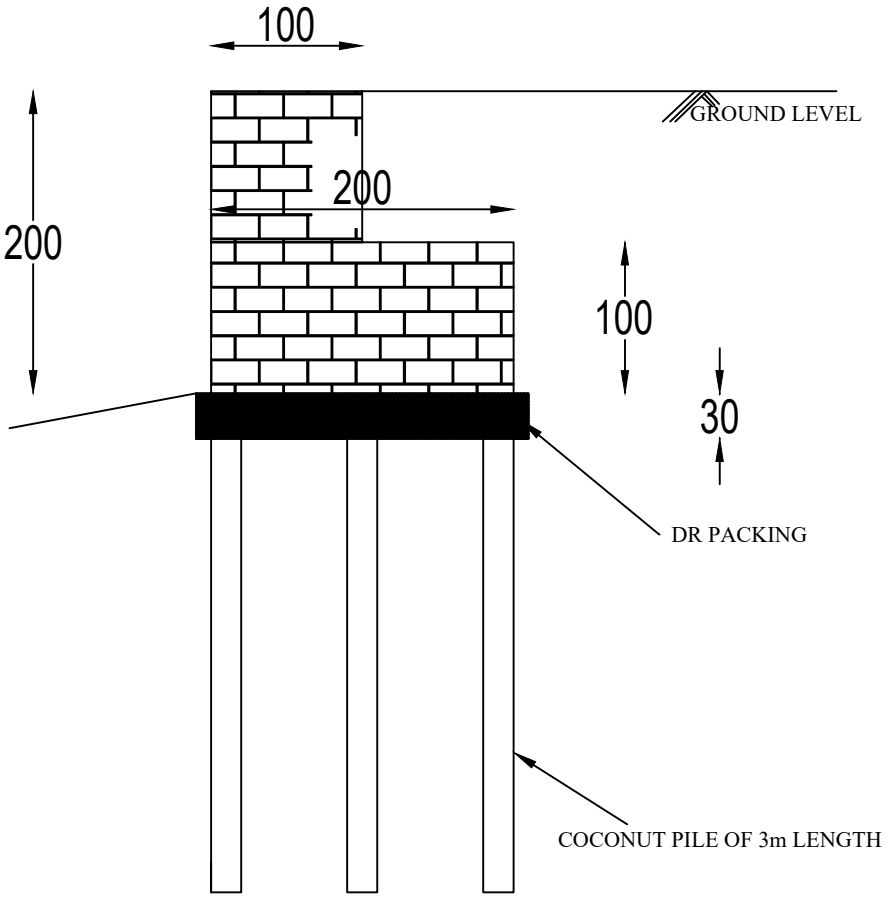
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO: 06/ 24 / AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:50			
TYPE:		REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	CHIEF ENGINEER: SIGNATURE
TITLE:	COMPOUND WALL AND SIDE PROTECTION				



CROSS SECTION OF COMPOUND WALL

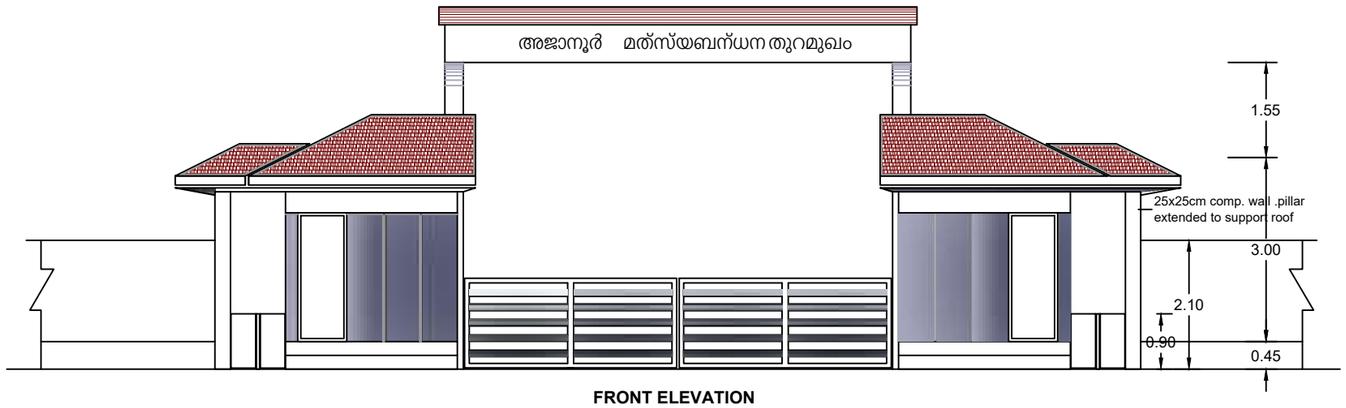


SIDE PROTECTION

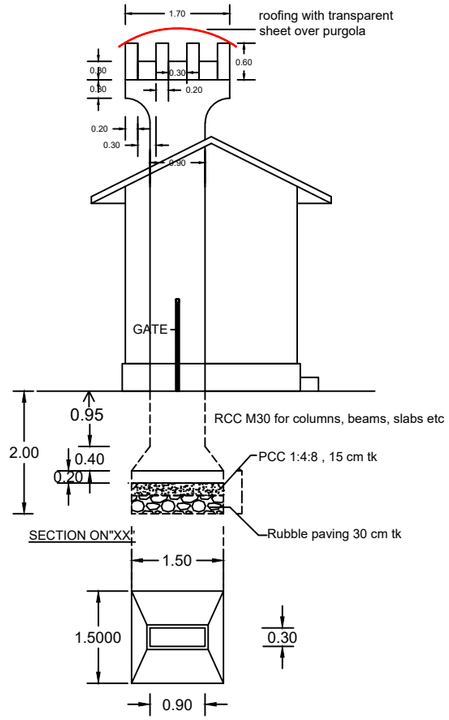
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

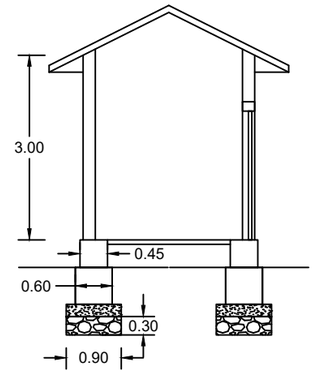
NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

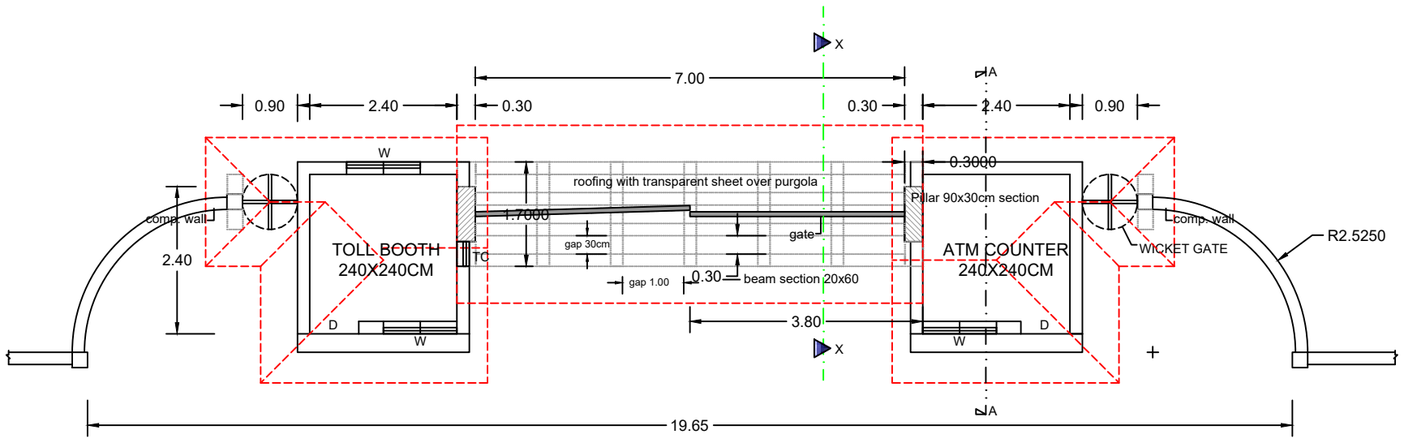
DATE:		DWG NO: 07/ 24 / AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:50			
TYPE:		REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	CHIEF ENGINEER: SIGNATURE
TITLE:	COMPOUND WALL AND SIDE PROTECTION				



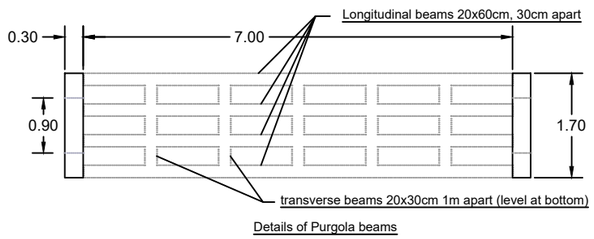
FRONT ELEVATION







PLAN OF GATE HOUSE



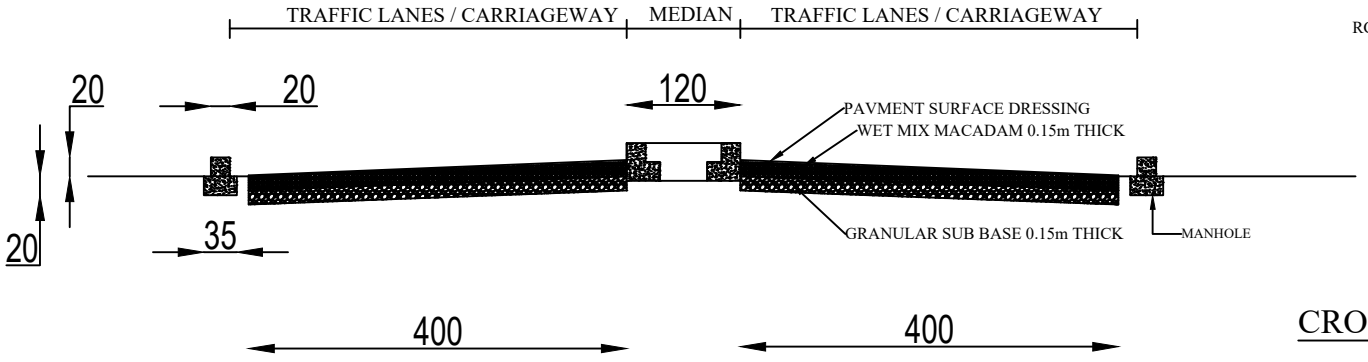
Details of Purgola beams

ALL DIMENSIONS ARE IN M

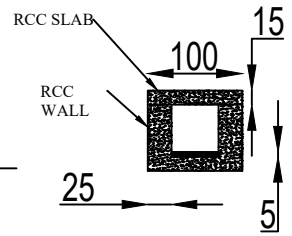
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	08 / 24 / AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:100		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	GATE AND GATE HOUSE				



CROSS SECTION OF ROAD

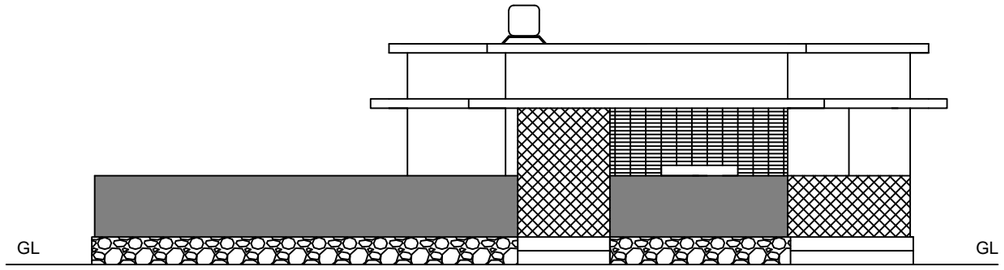


CROSS SECTION OF DRAINAGE

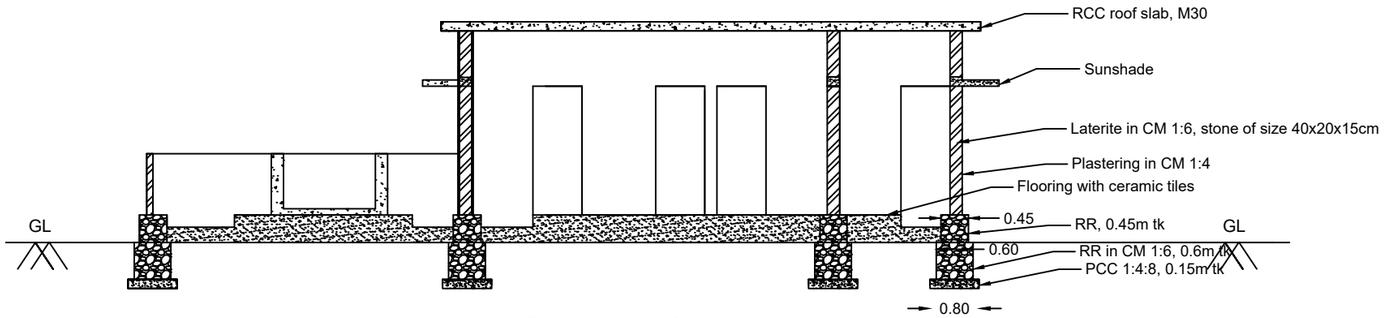
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

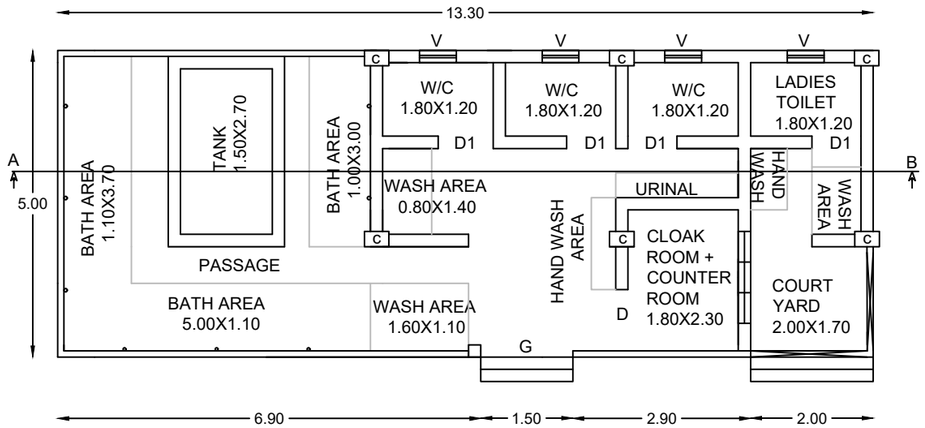
DATE:		DWG NO: 09/ 24 / AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:80			
TYPE:		REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	CHIEF ENGINEER: SIGNATURE
TITLE:	INTERNAL ROAD, PARKING AREA & DRAINAGE FACILITY				



ELEVATION



SECTION AB



PLAN

INDEX

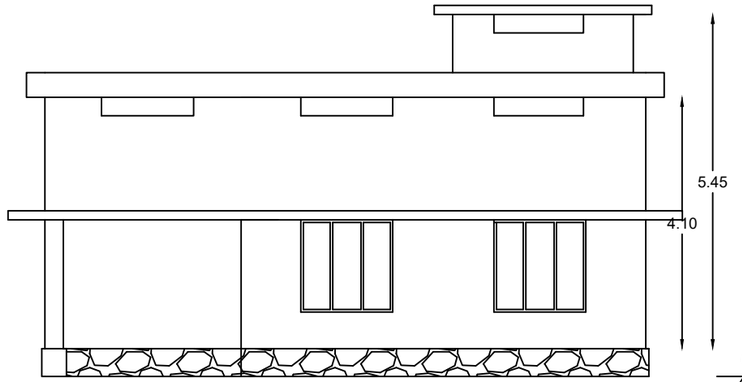
DOOR	D	=1.00X2.10
DOOR	D1	= 0.80X2.10
WINDOW	W	= 1.50X1.50
VENTILATOR	V	= 0.60X0.90

ALL DIMENSIONS ARE IN M

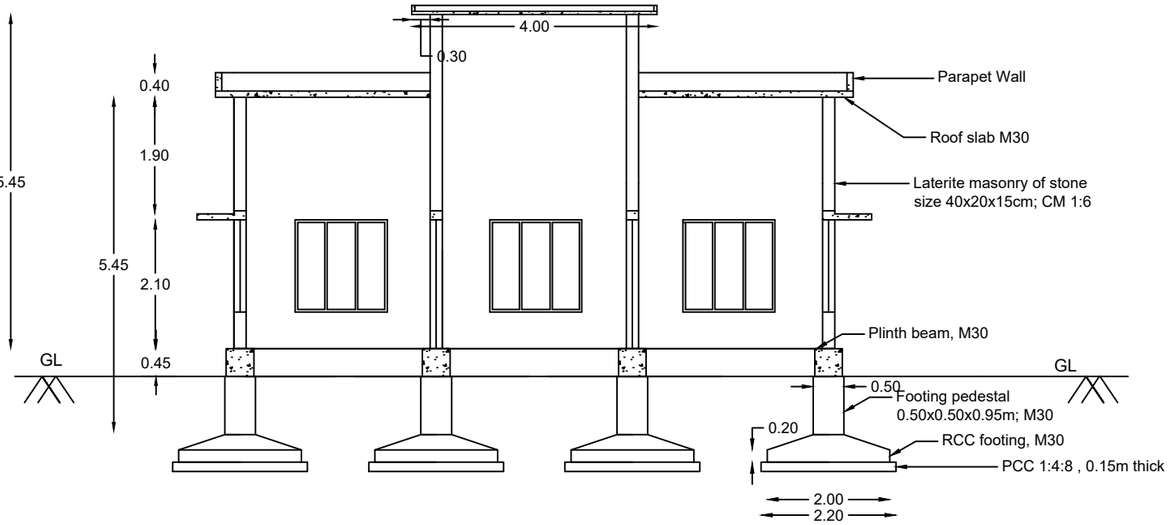
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

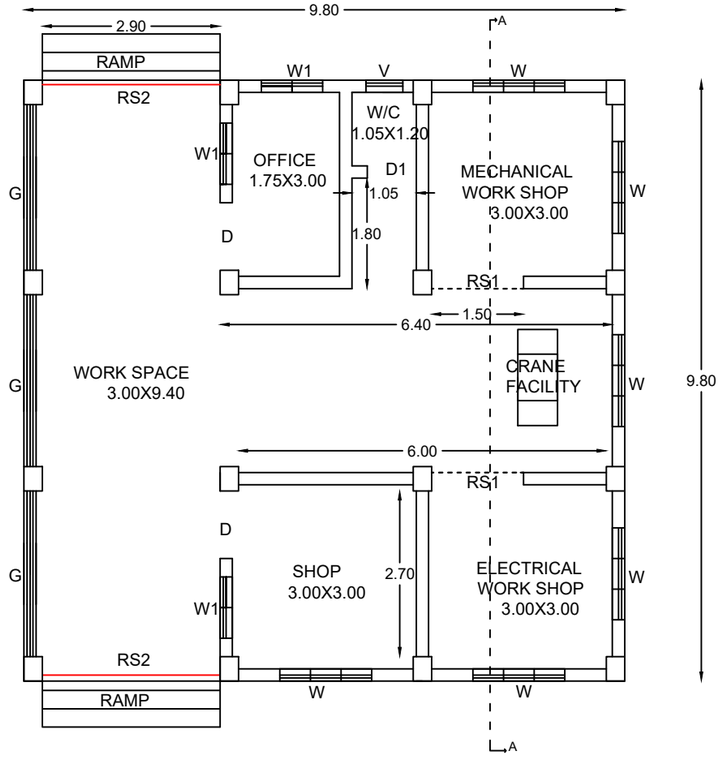
DATE:		DWG NO:	10 / 24 / AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:100		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	TOILET BLOCK				



ELEVATION



SECTION AA



PLAN

INDEX

DOOR	D =110X210
DOOR	D1 = 80X210
GRILL	G = 280X410
VENTILATOR	V = 60X60
ROLLING SHUTTER RS1 = 150X370	
ROLLING SHUTTER RS2 = 290X370	

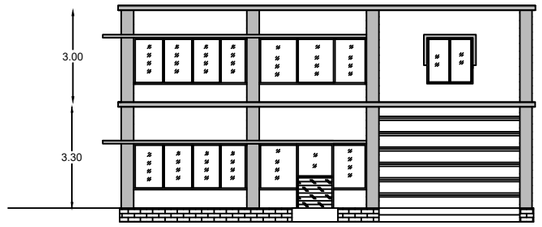
ALL DIMENSIONS ARE IN M

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

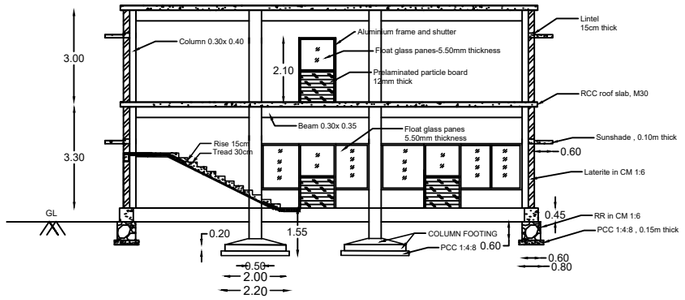
NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	11 /24 /AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:100		
TYPE:	PLAN	REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE / CHIEF ENGINEER: SIGNATURE
TITLE:	WORKSHOP BUILDING				

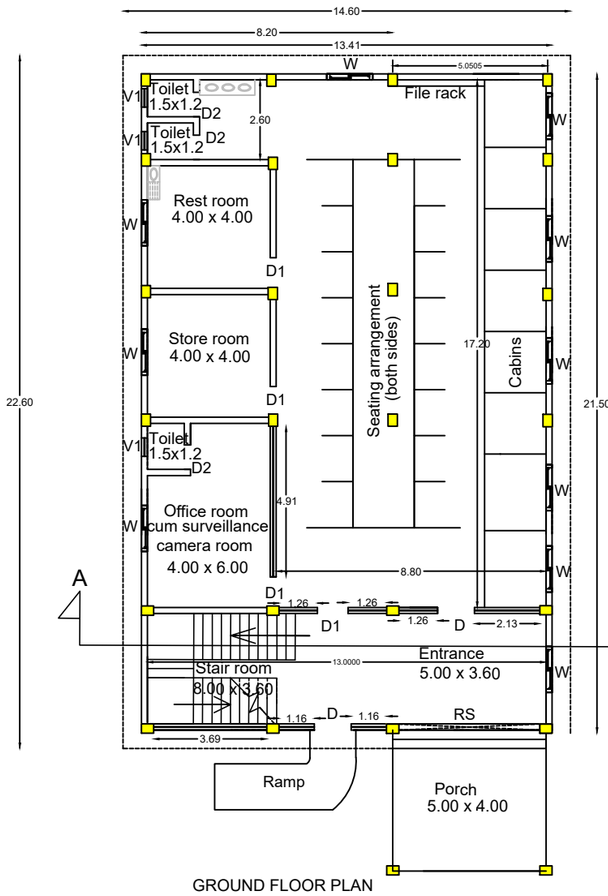
Ajanur Fishing Harbour - Construction of office room cum harbour surveillance camera room



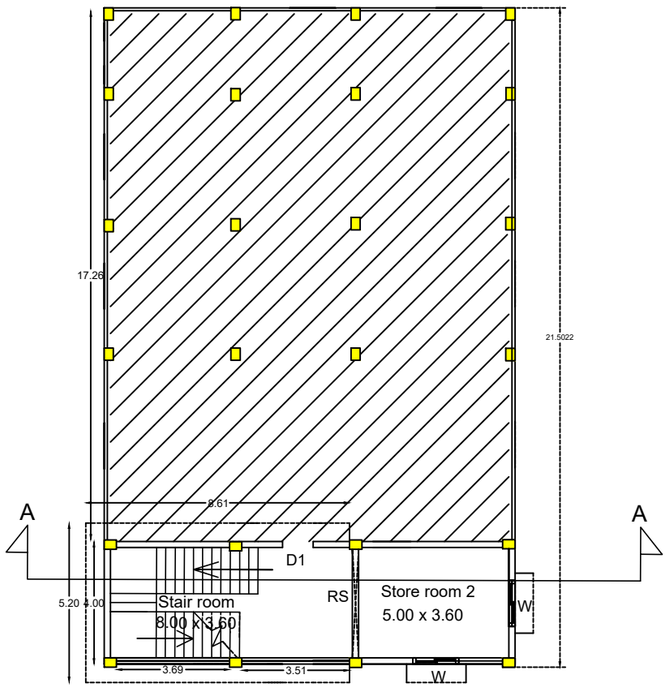
ELEVATION



SECTION A-A



GROUND FLOOR PLAN



FIRST FLOOR PLAN

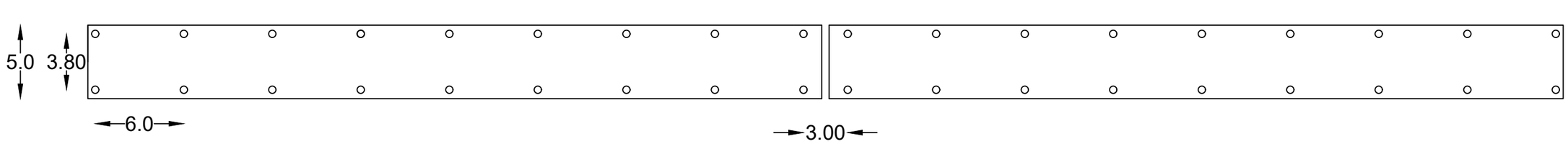
INDEX

DOOR	D	=1.20X2.10
DOOR	D1	= 1.00X2.10
WINDOW	W	= 1.50X1.50
VENTILATOR	V	= 0.60X0.60

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	12 /24 /AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:200		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	OFFICE ROOM CUM CAMERA SURVEILLANCE CAMERA ROOM				

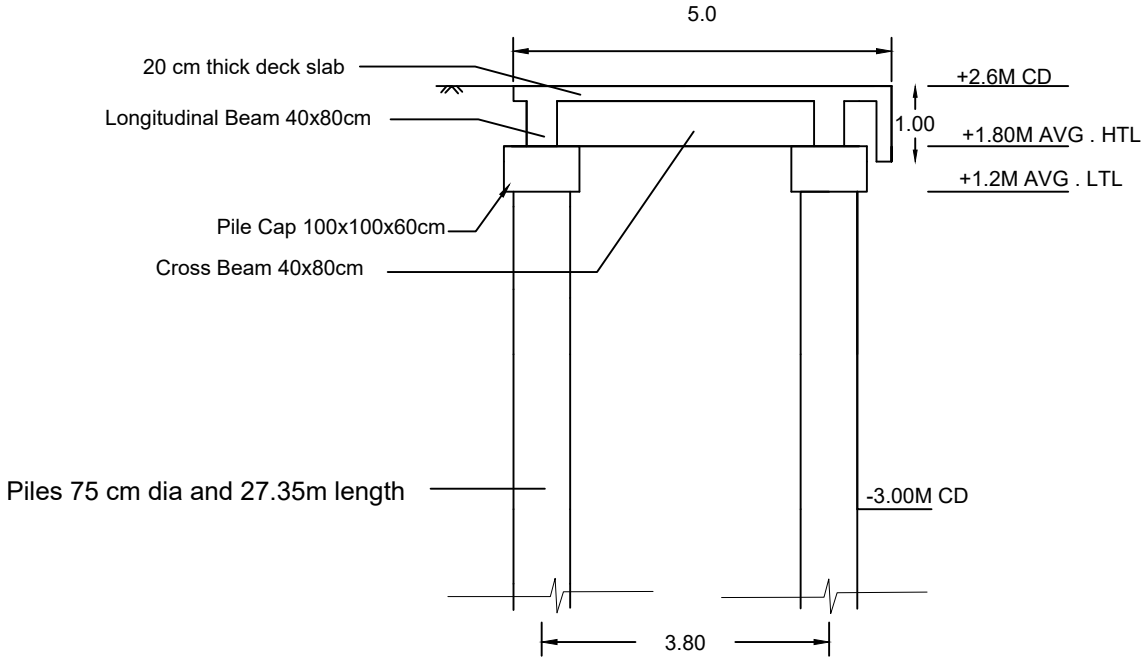


BERTHING WHARF- PLAN

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	13(a)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:100		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	WHARF FOR BERTHING FACILITY				

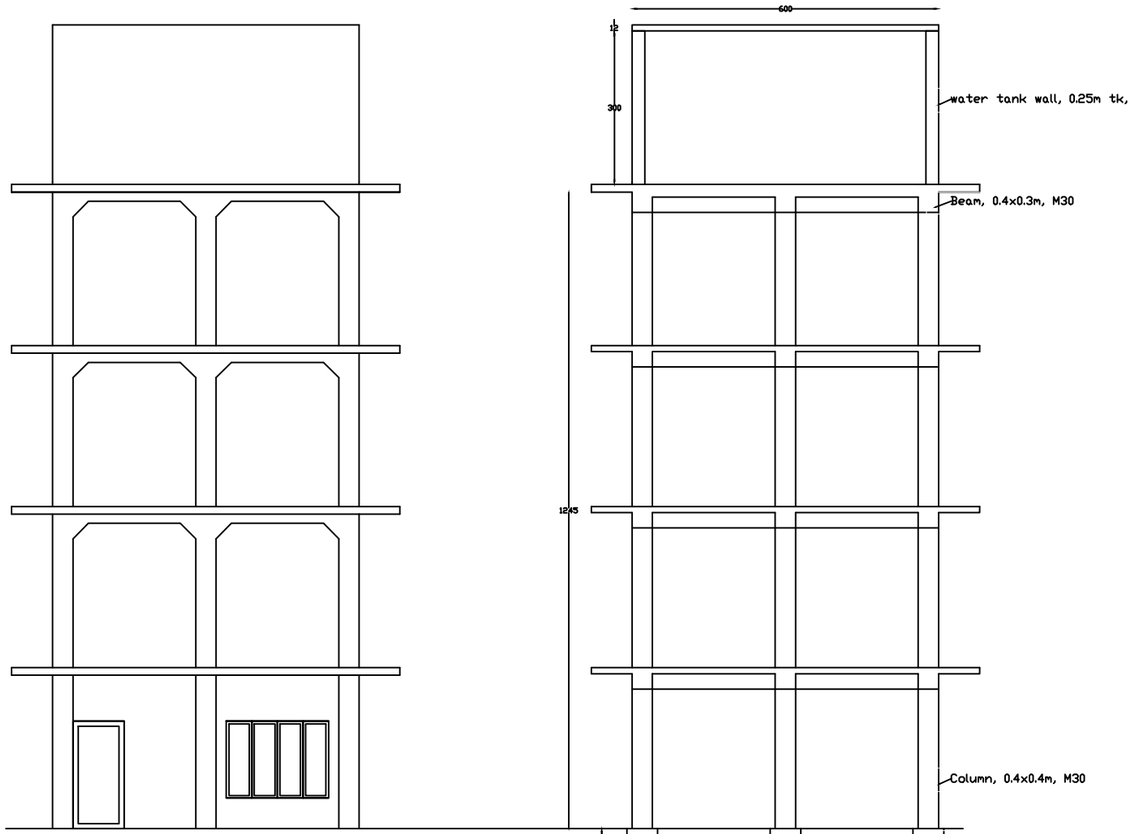


SECTION OF BERTHING WHARF

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

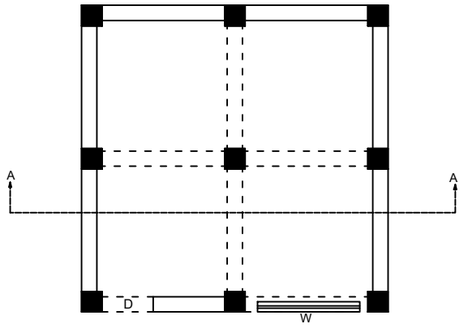
NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	13(b)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:100		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	WHARF FOR BERTHING FACILITY				



ELEVATION

SECTION AA



PLAN

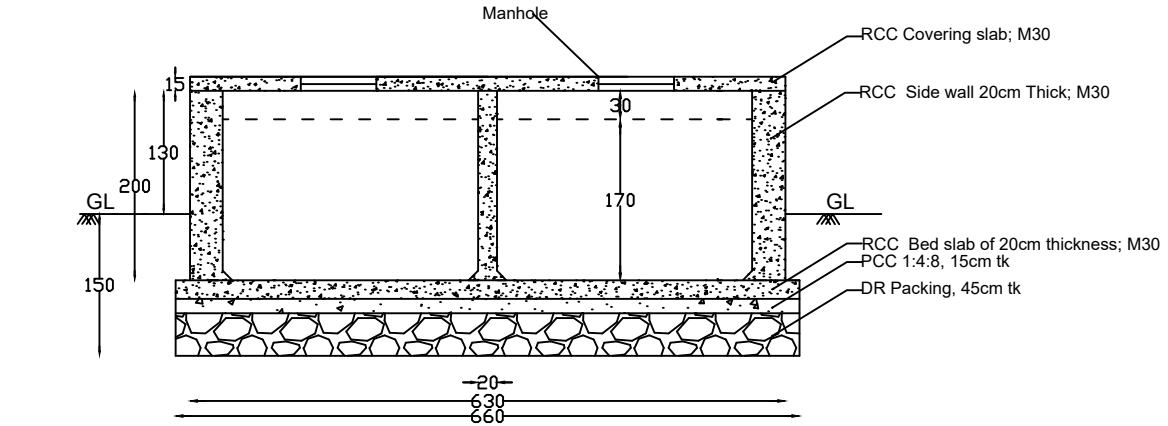
DOOR	100X210mm
WINDOW	200X150mm
AREA:-	36.00sqm

ALL DIMENSIONS ARE IN CM

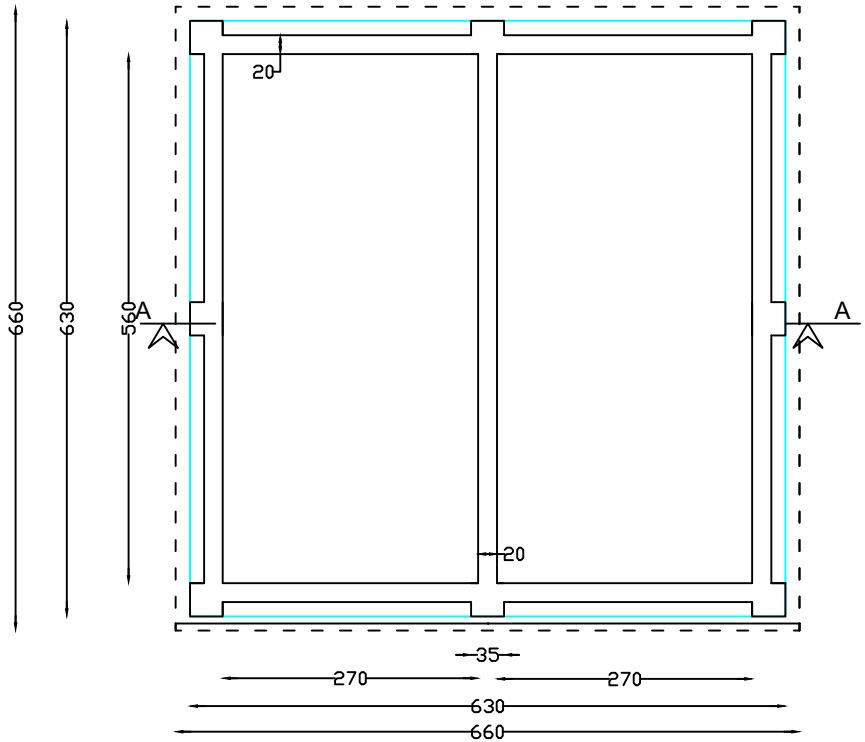
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	14(a) / 24 / AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:120		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	OH TANK				



SECTION A–A



PLAN SUMP

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	14 (b)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:80		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	WATER SUPPLY ARRANGEMENTS- SUMP				

കേരള സർക്കാർ

ഭരണഭാഷ – മാതൃഭാഷ

DFTVM/229/2022-K3

ഫിഷറീസ് ഡയറക്ടറുടെ കാര്യാലയം,
തിരുവനന്തപുരം.
തീയതി:05-02-2025
ഇ-മെയിൽ:fisheriesdirector@gmail.com

ഫിഷറീസ് ഡയറക്ടർ.

ചീഫ് എഞ്ചിനീയർ
ഹാർബർ എഞ്ചിനീയറിംഗ് വകുപ്പ്
തിരുവനന്തപുരം.

സർ,

വിഷയം:- ഫിഷറീസ്- കാസർകോഡ് ജില്ലയിലെ അജാന്തർ ഹാർബർ നിർമ്മാണം - പദ്ധതി പ്രൊപ്പോസൽ SLAMC of PMMSY അംഗീകരിച്ചത് - സംബന്ധിച്ച്.

സൂചന:- 1. താങ്കളുടെ 17.10.2024 തീയതിയിലെ HECE/517/2021-DR8 കത്ത്.
2. സർക്കാരിന്റെ 24.01.2025 തീയതിയിലെ FandP-B1/312/2024-FandP നമ്പർ കത്ത്.

****

മേൽ വിഷയത്തിലേക്ക് ശ്രദ്ധ ക്ഷണിക്കുന്നു. കാസർകോഡ് ജില്ലയിലെ അജാന്തർ ഹാർബർ നിർമ്മാണത്തിന് ഹാർബർ എഞ്ചിനീയറിംഗ് വകുപ്പ് തയ്യാറാക്കി സമർപ്പിച്ച 200 കോടി രൂപയുടെ പരിഷ്കരിച്ച പദ്ധതി രൂപരേഖ 15.01.2025 തീയതിയിലെ SLAMC of PMMSY അംഗീകരിച്ച് കേന്ദ്രസർക്കാർ അനുമതിക്കായി സമർപ്പിച്ച വിവരം സൂചനപ്രകാരം അറിയിച്ചിട്ടുണ്ട്. സൂചന (2) സർക്കാർ കത്തിന്റെ പകർപ്പ് താങ്കളുടെ അറിവിലേക്കായി ഇതോടൊപ്പം ഉള്ളടക്കം ചെയ്യുന്നു.

വിശ്വസ്തതയോടെ,

SMITHA R NAIR,
ADDITIONAL DIRECTOR OF FISHERIES
ഫിഷറീസ് ഡയറക്ടർക്കു വേണ്ടി.

ഉള്ളടക്കം :- സർക്കാർ (2) കത്തിന്റെ പകർപ്പ്

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GOVERNMENT OF KERALA

Fisheries & Ports (B) Department

No.B1/312/2024-FandPD 24-01-2025,Thiruvananthapuram

From

The Principal Secretary to Government

To

The Secretary,
Department of Fisheries,
Ministry of Fisheries, Animal Husbandry and Dairying,
Government of India,
Room No. 221, Krishi Bhawan, New Delhi-110001

The Chief Executive,
National Fisheries Development Board (NFDB),
Pillar No. 235, PVNR Expressway, SVPNPA Post,
Hyderabad-500052.

Sir,

Sub: Fisheries Department-PMMSY 2024-25-Revised Detail Project Report of 'Construction of Ajanur Fishing Harbour in Kasargod District'- forwarding of-reg.

Ref: 1.Government letter no. B1/240/2021- FandPD dated 24.03.2022.

Kind attention is invited to the reference cited in which the Detail Project Report of 'Construction of Ajanur Fishing Harbour in Kasargod District' at an outlay of Rs.110.33 crore was forwarded to Government of India for funding under PMMSY 2021-22.

The Project Appraisal Committee of Government of India considered the said project report and directed that the project report should be revised by enlarging the basin area taking into account the future development.

Accordingly, the revised Detail Project Report of 'Construction of Ajanur Fishing Harbour in Kasargod District' at an outlay of Rs.200 crore was placed before State Level Approval and Monitoring Committee(SLAMC) held on 15.01.2025 and the Committee recommended the the said revised Detailed Project Report for onward transmission to Government of India

Under above circumstances, the revised Detail Project Report of Construction of Ajanur Fishing Harbour in Kasargod District' at an outlay of **Rs.200 crore** and the

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minutes of the SLAMC meeting held on 15.01.2025 are forwarded herewith your favourable consideration and for funding under PMMSY 2024-25.

Yours Faithfully,

Signed by K Shashidhar Srinivas
Date: 24-01-2025 18:44:39

K S SRINIVAS
PRINCIPAL SECRETARY

Copy to : The Director of Fisheries, Thiruvananthapuram (for information)

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MINUTES OF THE STATE LEVEL APPROVAL AND MONITORING COMMITTEE MEETING (SLAMC) HELD ON 15.01.2025 AT 4.00 PM PRADHAN MANTHRI MATSYA SAMPADA YOJANA (PMMSY)

Meeting started at 4.00 pm. List of participants is appended.

2.The Principal Secretary, Fisheries Department welcomed all the members and officers to the State Level Approval and Monitoring Committee of PMMSY.

3. Deputy Director of Fisheries has made a detailed presentation on year wise progress of PMMSY projects. He informed that 53 out of 79 schemes were 100% completed since 2020-21.

4. Then Principal Secretary, Fisheries Department reviewed agency wise physical progress of projects.

5. The Managing Director, Matsyafed informed that all project under Matysafed can be completed by March 2025.

6. The Chief Engineer, Harbour Engineering Department (HED) informed that some projects need extension of completion date upto May 2025 as there were some uncertain components. He also suggested that there should be an increase in limit for Ways and Means Clearance from existing Rs.1 crore.

7. The Managing Director, ADAK informed that construction works regarding Brood Bank project is pending with Harbour Engineering Department. The Chief Engineer, Harbour Engineering Department replied that the contractor who has been assigned with the work needs to be terminated as he is facing financial issues and construction work can be completed with new contractor.

8. The Deputy Director of Fisheries informed that the project 'Installation of Artifical reef' under KSCADC is showing a good progress. The Chief Engineer, KSCADC reported that work tendered and negotiation is going on with bidders for Fish marked at Aluva. He also raised concern that the rehabilitation process for Fish market at Kozhikkode is facing issues as the rehabilitators need land as wells facilities. The Director of Fisheries opined that it is practically difficult to solve this rehabilitation issue in a limited time period.

9. Regarding Edakkazhiyoor Fishing Village, for the component 'Establishment of fisherfolk dwellings with required basic amenities', the Deputy Director of Fisheries reported that it is not possible to get MP / MLA fund. Hence the Chief Engineer, KSCADC suggested to carry out construction using Beneficiaries by providing fund from KSCADC stage by stages similar to Housing schemes. The Principal Secretary, Fisheries Department opined that if Central Government agrees and it doesn't violate PMMSY guidelines, above suggestion can be considered.

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10. Regarding Tanur Fishing Village in Malappuram, a few component required permission from Harbour Engineering Department to proceed. Hence Principal Secretary, Fisheries directed to get permission from HED at the earliest. Also regarding component 'Establishment tof OBM Repair Centre' Matsyafed need an agreement with HED for the usage of already constructed building. The Principal Secretary, Fisheries Department opined that there should be a coordination among various agencies to sort out issues like this. The Director of Fisheries informed that poor land identification is the reason for these issues.

11. Regarding the component 'deployment of artificial reef' in fishing villages, Director of Fisheries reported that fishing villages in northern districts are against the deployment of artificial reef based on the assumption that loose water bed there cause difficulty to fishing boats.The Chief Engineer, KSCADC informed that a survey will be conducted by CMFRI in northern districts of Kerala to study on deployment of artificial reefs.

12. The Deputy Director of Fisheries has presented the details of components changed due to non availability of SC/ST beneficiaries for some projects.

13. The Chief Engineer, Harbour Engineering Department presented the revised Detailed Project Report of 'Ajanur Fishing Harbour in Kasargod' at an outlay of Rs.200 crore. He informed that Government of India directed to increase the area of river basin, hence amount increased to Rs.200 crore. He reported that this project can stablise the migratory river mouth in the harbour and the recommendation of Coastal Zone Management Plan was satisfied.

14. The Registrar, KUFOS has made a brief presentation on already completedproject 'Aquatic Referral Lab for Quality Testing and diagnosis'. He informed that the whole expenditure of the project increased by an amount of Rs.19 lakhs due to hike in GST from 5% to 18%. The Director of Fisheries informed that the said amount can be either utilise from plan fund of KUFOS or request to State Government, as any kind of cost escalation is not entertained as per PMMSY guidelines.

15. The Principal Secretary, Fisheries has enquired with Chief Engineer, Harbour Engineering Department about the progress of 'Expansion of Muthalapozhy Fishing Harbour in Thiruvananthapuram district". The Chief Engineer replied that the whole work was divided into four components and one component is completed and rest is in progress. The Principal Secretary, Fisheries Department suggested to adopt Quality and Cost Based Selection (QCBS) method to evaluate bids.

16.After detailed discussion, the following decisions were taken.

Decision

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1. There should be a proper coordination among various agencies under Fisheries Department to sort out issues in project implementation and timely completion of the projects. **(Action : Director of Fisheries, Chief Engineer, Harbour Engineering Department, Managing Director, ADAK, Managing Director, Matsyafed, Managing Director, KSCADC)**
2. Steps should be taken to resolve all issues such as rehabilitation in Kozhikode Fish market, Land related issues in Fishing village projects etc. **(Action : Director of Fisheries, Chief Engineer, Harbour Engineering Department, Managing Director, Matsyafed, Managing Director, KSCADC)**
3. Recommended the revised Detailed Project Report of 'Ajanur Fishing Harbour in Kasargod' at an outlay of Rs. 200 crore for onward transmission to Government of India.
4. Recommended the details of projects which have component change, for onward transmission to Government of India.

17.Meeting ended at 5.15 pm.

Appendix

List of Participants

Sl.No	Name	Designation
1	Sri. Abdul Nasar. B I.A.S.	Director of Fisheries
2	Sri. Sibi.N	Under Secretary, Water Resources Department (Representative of Secretary, Water Resources Department)
3	Smt. Megha. R	Section officer, Agriculture Department (Representative of Secretary, Agriculture Department)
4	Sri. Pradeesh. M	Section officer, Local Self Government Department,(Representative of Secretary, LSGD)
5	Sri. Sreejesh. P.S	Manager, State Level Bankers Committee (SLBC) (Representative of Convenor, SLBC)
6	Sri. Anuraj.A	Scientist, CMFRI
7	Dr. Dinesh K.	Dean, KUFOS

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GOVERNMENT OF KERALA

Harbour Engineering Department



CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DETAILED PROJECT REPORT

PRADHAN MANTRI MATSYA SAMPADA YOJANA

OCTOBER 2024

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SYNOPSIS

Ajanur is a fishing village situated near Chithari River with an urban catchment of high population density. The river is to the north of Kanhangad Town in Kasaragod District. This area is a well-known fishing area in Kasaragod District and a number of fishing crafts operate from this area. Both the fishermen and the fishery industry of the region are persistently demanding for further development of the area. In addition to the demand for construction of a new fishing harbour, there have been persistent demands to make the Chithari river mouth permanent and prevent the formation of the sand bars at the mouth.

The mouth of Chithari River is of migratory nature and often gets completely closed in summer seasons. The closing of the river mouth causes flash floods at the coastal areas where the estuary out falls in to the sea. People living on the upstream side of river face disaster due to this. The condition gets aggravated as the catchment or the storm drainage area of the river is densely populated urban area. The discharge from the river is not sufficient to flush out the sand bars created by coastal marine morphology, hence man made efforts are required on an annual basis to open the river mouth before monsoons. Another problem is the migratory nature of the river mouth, which moved far south in the last few years causing damages to the auction halls and other infrastructure created for fishery at the site.

Harbour Engineering Department entrusted Mathematical Model Studies to Central Water Power Research Station (CWPRS, Pune) for establishing a fishing harbor and for training work of Chithari River. The layout of breakwaters for construction of an open sea fishing harbor is based on this model study.

This detailed project report is prepared for the construction of an open sea fishing harbour and river training work along with other infrastructures at Ajanur in Kasaragod District in Kerala State under PMMSY. The master plan includes construction of north and south breakwaters, training wall on the north side based on CWPRS recommendations, wharf and auction hall, dredging and reclamation, berthing wharf, canteen, net mending shed, shop rooms, locker rooms, gate and gate house, office cum surveillance room, ETP etc .The estimated project cost including all the components is **20000 lakh** The estimate is prepared using Kerala Government PRICE software, which is based on the DSR 2018 rates with current cost index for Kasaragod District (33.05%).

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Annexures **Ajanur Fishing Harbour – Calculation of wharf length, Cost Benefit Analysis, Soil Investigation Report, Mathematical Model Study Reports, Estimates, Drawings**

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1. PROJECT SUMMARY

1.	Title of the project	Construction of Ajanur Fishing Harbour
2.	District	Kasaragod
	Taluk	Kasaragod
	Corporation/Municipality/Panchayath	Ajanur GramaPanchayath
	Assembly Constituency	Kanhangad LAC
3.	Implementing agency	Harbour Engineering Department
4.	DPR prepared by	Harbour Engineering Department
5.	Project outlay	Rs. 20000 lakhs
6.	Nature of the project	Construction of new Fishing harbour
7.	Present status of existing Fisheries Infrastructure	Fish landing Centre
8.	Need for the project (Brief)	• Providing a safe harbour for the artisanal fishing operations in Kasargode District. • To improve the hygiene standards in post-harvest operations and ensure better product quality satisfying EEC/HACCP norms. • To promote responsible fishing practices as envisaged by FAO. • Providing training works for Chithari River to keep the estuary open and prevent inundation.
9.	Total estimated cost and item wise cost break up	Project Abstract of Estimate (Attached as Annexure)
	Whether detailed estimate attached?	Yes (Attached as Annexure)
10.	Details of revenue streams	User charges, Lease of rights
11.	Details of project risks	• Availability of Construction materials Availability of Labourers • Quarrying restrictions • Fund flow • Climate changes

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12.	Details of project management organisation strategy	• Estimation, Technical Sanctions, Tendering and Agreement Execution will be done by Harbour Engineering Department • PRICE software is the tool for preparing, scrutinizing and transmitting the estimates. • Tendering will be done by inviting online e-tenders from pre-qualified contractors. • MS Project is the tool used for scheduling the projects. • Work Execution and preparation of Bills will be done by Harbour Engineering Department.
13.	Details of contract management strategy	• The Public Works manual of state government specifies the duties, responsibilities and delegated powers of officers in contract management. It also specifies fines for project delays and incentives for early completion. • HED will invite tenders, execute agreement and supervise the work.
14.	Details of Project Implementation Schedule (PIS) & Work Breakdown Schedule (WBS) Proposed duration to complete the project	WBS Bar Chart.
15.	Details of statutory clearances obtained	
16.	Quality Control infrastructure and mechanism	• Three tier quality control systems will be implemented. • First tier quality control will be done by the contractor. • The second tier quality control will be done by the QC wing of HED. • For third tier QC the service of a reputed

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		institution outside HED will be utilized.
17.	Details of attached drawings	• Key Map of Project Location • General Layouts • Breakwater sections • Wharf and auction hall • Gate and Gatehouse • Net Mending shed, Locker room, Canteen, Shop rooms • Compound wall and Side Protection Works • Parking Area and Internal Road • Dredging and Reclamation bund • Wharf for berthing facility
18.	Other attachments	• General abstract • Detailed estimate • Model Study Report

2. INTRODUCTION

2.1 Location and Regional Setting

2.1.1 Ajanur is one of the prominent fishing villages of Kasaragod district with extensive fishing activity. The project site is situated near the estuary of Chithari backwaters and is located in Ajanur Gram Panchayath in KasaragodTaluk. Project site is located at 12.33° Latitude and 75.06° Longitude.

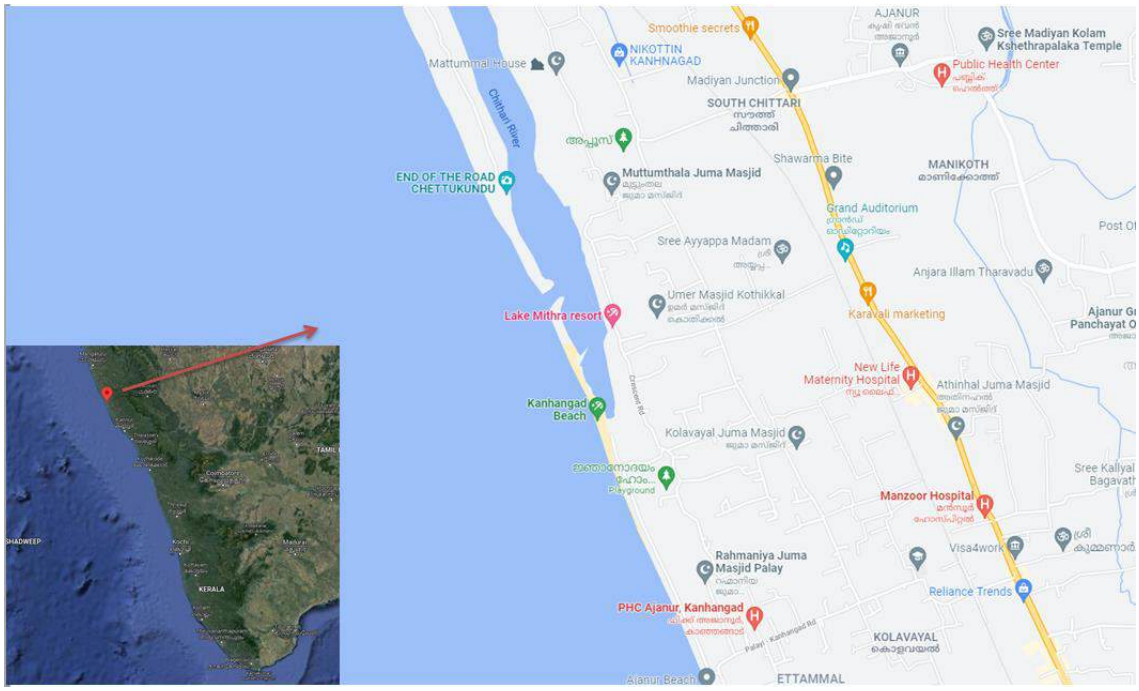


Figure 2.1 Location map of proposed fishing harbor site

2.1.2 The site is easily accessible from major roads through a network of coastal roads. The proposed project site is located 17 km north of existing Cheruvattur Fishing Harbour and 17km south of Kasargod Fishing Harbour.

2.2 Necessity of the Proposal

2.2.1 In order to meet the temporary needs of the poor fishermen of the area, a fish landing center was constructed, accessible through the Chithari River, as part of ICAD project. There is an auction hall, net mending shed and toilet block situated at the southern bank of estuary of Chithari River. But, this landing centre is not fully used by the fishermen due to the inadequate facilities.

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2.2.2 Here, use of landing centre is mainly dependent on availability of shore in front of it. Sometimes, shore is eroded very close to auction hall, and any further erosion may lead to the collapse of the structure. Local fishermen demanded to have a jetty in front of it, and other additional facilities. Protection wall is also necessary to avoid soil erosion from the land. There is also demand from the fishermen of nearby area of Chitharikadappuram to construct a fish landing center for them also. All these point to the extensive fishing operation of the region. Fishing villages from Hosdurg to Pallikkara will be benefited by the project.

2.2.3 At present, the fishermen of the locality carry out their fishery activities from Chithari River. The coastal morphological changes at this river mouth are highly complex. The migration of the river mouth and the formation of sand bars have caused considerable loss of human life and land property in this area. During the onset of monsoons and when there are heavy rains in the catchments upstream, the closing of the river mouth causes extreme problems like flash floods all along the highly populated upstream area, and the people here are reportedly rehabilitated to safety each time.

2.2.4 The fishermen venturing in to the sea or coming back with the catches face extreme danger at the river mouth due to presence of sand bars. Many lives have been lost in the last few years due to this. Also the fishing vessels and engines are damaged. The river mouth needs to be manually dredged to avoid sudden flashfloods during the onset of monsoon. Often the government machinery fails to do this in time causing flood related disasters to the people living upstream. Hence there is an urgent requirement to provide necessary river training work of Chithari River to arrive at a permanent solution to the problems faced by the local population.

2.3 The Proposal

2.3.1 This proposal is put forward to construct a fishing harbour to provide necessary infrastructure facilities to cater to the needs of the locality. The mouth of Chithari River is of migratory nature and often gets completely closed in summer seasons. The discharge from the river is not sufficient to flush out the sand bars created by coastal marine morphology, hence man made efforts are required on an annual basis to open the river mouth before monsoons. Provision for training work of

Chithari River is also included in this proposal to address the issues caused by the migratory nature of the river and to keep the estuary open. Width of the channel provided is 130 m which is not sufficient for the safe navigation of the vessels in rough season. Hence it is proposed to construct an open sea harbour

2.3.2 This proposal consists of provisions for construction of north breakwater of 1150m length and south breakwater of 425 m length, river training work of 435 m length, wharf, auction hall, dredging and reclamation, canteen, net mending shed, shop rooms, locker rooms, gate and gate house, etc. As per the model study report (No: 6283) shore protection measures needs to be provided on north and south side of the development after monitoring the shore line changes post harbour construction which is explained in the conclusion 7.0 (v and vi) as

"If the erosion on the south side of the proposed fishing harbour is progressive after the development then a suitable shore protection measure in the form of a seawall or series of groynes may be provided."

and

"If the shifting of the river mouth is pronounced after the proposed development of the river training works then a seawall of appropriate length may be provided to arrest the shifting of the river mouth."

Hence the provision for this component is not included in this DPR which may be taken up later.

2.3.3 The estimates were prepared using Kerala Government's PRICE software, which is based on the CPWD data, DSR 2018 rates and the current cost index for Kasargod District. The total cost for the proposed fishing harbour at Ajanur comes to **Rs. 20000 lakh**

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3. BACKGROUND INFORMATION

3.1 General

3.1.1 Kerala is blessed with a coastline of 590 km and having extensive brackish water lakes and estuaries. With a total fishermen population of more than 14 million and rich marine and inland water resources, fisheries and aquaculture forms an important sector with regard to activities in the state. Kerala occupies a premiere position in Indian fisheries by contributing about 13% of the marine landings fishing industry which has employment, livelihood, and food security of the country. The state has been a pioneer in introducing several innovative measures in harvest and post-harvest technologies in India. The technological advancements in fisheries have considerably influenced the fishing zone substantially in the last four decades with the continuous intensification of the fishing effort contributes significantly to economic, social and nutritional wellbeing of the people.

3.1.2 Fishery industries occupy an important role in the economy of Kerala. The export of fish products from Kerala worth approximately Rupees 6971 Crore, making it 12% share of India in value and 13% in quantity.

3.2 Fisheries sector in Kerala at a Glance

3.2.1 A brief outline of the fishery details of Kerala state is given below:

- 590 km Coastline
- 222 Marine and 113 Inland Fishermen Villages
- 10.54 Lakh Fishermen Population
- About 6.01 Lakh Metric Tonne Marine Fish Production
- About 15% Share in India’s Total Annual Marine Fish Production

3.3 Fisheries Infrastructure in Kerala

3.3.1 Construction and commissioning of a number of fishery harbours and landing centres, introduction of new generation fishing craft and gears - both in the traditional and mechanised sectors, NCDC assisted motorisation programme for

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traditional craft implemented by Matsyafed (Kerala Government undertaking), various social welfare measures taken to improve the living standards of fishermen like housing, roads, water supply schemes, fisheries schools etc, have brought considerable development to the fisheries sector of the state during the last decades. Out of the 25 fishery harbours in the state, 22 are operational and balance 3 are at various stages of construction. All harbours constructed in the state are by the Harbour Engineering Department. The detailed status of the Fishery Harbours in Kerala is given below:

Table 3.1 List of Fishing Harbours in Kerala State

No	Harbour	Nature	Location	Remarks
1	Vizhinjam	Mechanised	Thiruvananthapuram	Operational
2	Muthalapozhy	Mech. & Traditional	Thiruvananthapuram	Completed
3	Thangassery	Traditional	Kollam	Completed
4	Neendakara	Mechanised	Kollam	Completed
5	Chethi	Mech. & Traditional	Alappuzha	Work in Progress
6	Arthungal	Mech. & Traditional	Alappuzha	Work in Progress
7	Thottappally	Mechanised	Alappuzha	Completed
8	Kayamkulam	Mech. & Traditional	Alappuzha	Completed
9	Munambam	Mech. & Traditional	Ernakulam	Completed
10	Chellanam	Mech. & Traditional	Ernakulam	Completed
11	Chettuva	Mech. & Traditional	Thrissur	Completed
12	Ponnani	Mech. & Traditional	Malappuram	Completed
13	Thanur	Mech. & Traditional	Malappuram	Completed
14	Parappanangadi	Mech. & Traditional	Malappuram	Work in Progress
15	Beypore	Mechanised	Kozhikode	Completed
16	Puthiyappa	Mechanised	Kozhikode	Completed
17	Koyilandi	Mech. & Traditional	Kozhikode	Completed
18	Chombal	Traditional	Kozhikode	Completed
19	Vellayil	Mech. & Traditional	Kozhikode	Completed
20	Thalai	Mech. & Traditional	Kannur	Completed
21	Azheekkal	Mechanised	Kannur	Completed
22	Moplabay	Mech. & Traditional	Kannur	Completed
23	Cheruvathur	Mech. & Traditional	Kasargod	Completed
24	Kasargod	Mech. & Traditional	Kasargod	Operational
25	Manjeswaram	Mech. & Traditional	Kasargod	Completed

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3.4 Resource Potential

3.4.1 According to the available estimates of potential fishery resources of the West Coast, particularly in the south-west coasts, Kerala possesses the richest fishing grounds in the region. Studies estimate that about 8 Lakh metric tonne of marine fish can be sustainably harvested from Kerala waters.

3.5 Marine Fish Production

3.5.1 The actual landing efforts of the traditional craft are virtually confined to 0 to 20 m and mechanised craft up to 50 m. The present level of marine fish production in the state is about 6 lakh tonnes per annum. Hence about 2 lakh tonnes of fish within the maximum sustainable yield is still left un-harvested.

Table 2.2 Marine Fish production of Kerala through 2011-12 to 2021-22

Year	Production in Lakh T
2011-12	5.53
2012-13	5.31
2013-14	5.22
2014-15	5.24
2015-16	5.17
2016-17	4.88
2017-18	4.84
2018-19	6.09
2019-20	4.75
2020-21	3.91
2021-22	6.01

3.5.2 This can be harvested only by increasing the number of fishing days, by providing safe landing facilities, improving the fishing gears, improving the operating range of vessels by providing safe berthing facilities wherever possible.

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3.6 Shore Based Facilities

3.6.1 Shore based facilities like ice plants, cold storages etc., are available all along the coastal region. Rigorous fishing activities are already going on in and around the fishing villages of the state.

3.6.2 The shore-based facilities now available at Thiruvananthapuram district will be capable to take care of the additional landing due to up gradation of the fishery harbour. A well-developed road network connecting the coastal belt and the hinterlands makes the transportation of fish and fish products easier. Railways also play a major role in the transportation of fish products.

3.7 Fish Marketing

3.7.1 Fish, Prawns and other High Value Catches are usually auctioned at the local centres immediately after landing. Local private agencies collect most of the prawn for processing. High Value Catches landed will be allocated to export market and about 80% of the rest of the fish landed is taken to the inland markets. The financial institutions in the area as well as co-operative bodies provide financial assistance for marketing.

3.8 Ownership and Management of fleets

3.8.1 Individuals or fishermen groups own traditional as well as mechanized crafts in most of the cases. Matsyafed plays a prominent role in coordinating the entire fishing activities in the fishing villages. Banks and societies also provide financial assistance for the repair of the vessels, purchase of OBMs, fishing gear and other capital investments.

3.9 Fishery Development Programmes

3.9.1 For the proper planned development of fishing industries in Kerala, modernization of existing crafts, introduction of new generation crafts, processing and marketing, landing and shore-based facilities are essential prerequisites.

3.9.2 Basic need for fishing operation either in mechanized or artisanal sector is a sheltered harbour basin, and adequate berthing and anchoring facilities. Kerala is

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much ahead in providing these facilities. By now 21 fishery harbour projects are completed and few projects are progressing.

3.9.3 This has brought a sizable income to the fishermen community and the social status has improved very much during the past two decades. Now the focus of the Government is to complete the projects already started, expand the existing one to meet the present day demands and also to improve the facilities in the existing harbours to international standards. State Government is adopting a comprehensive approach towards this, which includes improvement of hygienic standard, providing adequate post-harvest infrastructure and cold storages, facilities for fish processing and value addition.

3.10 Fishing Activities in the Project Region

3.10.1 The general background information regarding the coastal areas of the district is summarised below.

Table 3.3 General Background Information

Kasaragod District		
1	Length of coastline	70 km
2	% Coastline of Kerala state	11.86 %
3	Fish Landings per Year	35163 T
4	% Landings of Kerala State	4.38 %
5	Total Fishermen Population 2022-2023	45919
	Male	18548
	Female	17129
	Children	10206
	Active Fishermen	10928

(Source: Fisheries Guide 2023, Fisheries Department, Kerala)

3.11 Fishing Villages

3.11.1 The details of major marine fishing villages of Kasargod district are given below

Table 3.4 Major marine fishing villages of Kasargod district

KASARGOD DISTRICT (16 Nos)			
Sl. No.	**Name of Fishing Village**	**Revenue Village**	**Panchayath**
1	Thrikaripur	Valiyaparambu	Valiyaparambu
2	Valiyaparambu	Valiyaparambu	Valiyaparambu

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3	Padannakadappuram	Padanna	Valiyaparambu
4	Thaikadappuram	Neeleswaram	Neeleswaram
5	Kadangode	Cheruvathur	Cheruvathur
6	Poonjakadappuram	Kanhangad	Kanhangad
7	**Hosdurg**	**Hosdurg**	**Kanhangad**
8	**Ajanoor**	**Chithari**	**Ajanoor**
9	**Pallikkara**	**Pallikkara**	**Pallikkara**
10	Kottikulam	Uduma	Uduma
11	Kizhoor	Kalanad	Chemmanad
12	Kasaba	Kasaragod	Kasaragod
13	Kavungoli	Kudlur	MogralPuthur
14	Koyippady	Koyippady	Kumbala
15	Shiriya	Mangalpady	Mangalpady
16	BengaraManjeswar	Hosabettu	Manjeswar

3.12 Benefited Population:

3.12.1 The population of Hosdurg, Ajanoor and Pallikkara fishermen villages is the direct beneficiaries of the project. Population details and fishermen statistics of these villages are shown below.

Table 3.5 Beneficiary Details

Sl. No	**Fishermen Village**	**Population**	**No. of Registered Fishermen**
1	Hosdurg	1575	354
2	Ajanoor	2965	793
3	Pallikkara	2554	991
Total		**7094**	**2138**
Fishermen statistics. Source: Fisheries Dept.			

3.12.2 Statistics of registered fishing crafts is shown in the table below.

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Table 3.6 Details of Fishing Vessels Registered at the Base

Sl. No	Fishermen Village	No. of Fishing Crafts		
		Motorised Non Mechanical	Motorised Mechanical	Non Motorised
1	Hosdurg	165	41	9
2	Ajanoor	207	4	13
3	Pallikkara	181	5	8
	Total	**553**	**50**	**30**
Source: ReAL Craft Portal, Dept of Animal Husbandary, Dairying and Fisheries, GoI				

3.13 Marine Fishery Potential of the Kasaragod Region

3.13.1 The annual landings of Kasaragod District during 2003 to 2022 are given below.

Table 3.7 Annual Landings of Kasaragod District

Year	Landings (Tonnes)
2013-2014	38382
2014-2015	51902
2015-2016	45418
2016-2017	28689
2017-2018	52224
2018-2019	35163
2019-2020	12364
2020-2021	19259
2021-2022	20123

(Source: Fisheries Guide 2023, Fisheries Department, Kerala State)

3.14 Fish Marketing

3.14.1 The fish landed are generally auctioned at the auction hall and the local vendors take the fish to export and inland markets. There is a well-developed road network to take the fish to all major inland markets. The site is easily accessible from major roads through a network of coastal roads.

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4. MATHEMATICAL MODEL STUDY

4.1 General

4.1.1 Harbour Engineering Department entrusted the model study for constructing an open sea fishery harbour at Ajanur, and river training work of Chihari River near the harbour to CWPRS Pune.

4.1.2 The CWPRS conducted model study and recommended layouts based on the study. It was decided to construct two rubble mound breakwaters of 1150m at the northern side and 425m at the southern end providing a tranquil basin inside the harbour. The northern breakwater of the harbour also acts as river training on one side of Chithari River. Rubble mount breakwater of length 435m is proposed on the other end of the river for river training work. Also, shore protection work needs to be carried out at the foot of the southern training breakwater. They also conducted desk and wave flume study and recommended the optimum cross-sections for the breakwaters.

4.2 Tidal Levels and Currents

4.2.1 The proposed site of development is about 25 km south of Kasargod. Important tidal levels at Kasargod with respect to Chart Datum are reported to be as under:

- MHHW : 1.4 m
- MLHW : 1.3 m
- MSL : 1.0 m
- MHLW : 0.9 m
- MLLW : 0.4 m

4.2.2 This indicates that the maximum tidal range at the study area is of the order of 1.0 m. Tidal currents are generally parallel to the coastline and directed northward during flood as well as ebb tide with the maximum magnitude of the order of 0.4 m/s.

4.3 Sediment Characteristics

4.3.1 Bed samples were collected from different locations at the proposed site at Ajanur. Based on the analysis of the bed samples, the bed material in the vicinity of the proposed site is mainly composed of medium to fine sand and silt, whose mean grain size, D_{50} varies from 0.05 mm to 0.6 mm.

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4.4 Modelling Techniques

4.4.1 Mathematical models; MIKE 21 SW and LITPACK, were used for the simulation of near shore wave field and long shore transport near the proposed fishery harbour at Ajanur.

4.5 Wave Conditions

4.5.1 The input wave conditions used for the wave tranquillity studies are given as follows.

Table 4.1 Input wave conditions studied

Incident Wave Direction	Incident Wave Height (m)
SSW	1.5
SW	2.0
WSW	2.5
WEST	2.5
WNW	1.5

4.6 Littoral Drift

4.6.1 The general orientation of the coastline at the proposed site is NW-SE making an angle of about 335^{0}with respect to north. Further, depending on the wave direction with respect to the coastline, the littoral drift will be either directed northward or southward along the shoreline. The model was simulated for the cross-shore profiles for the seasonal and the annual wave climates.

4.6.2 Annual and seasonal net and gross littoral drift were estimated using LITDRIFT model. The northward and the southward drift are calculated based on the gross and the net littoral drift. The littoral drifts are reported in the following table:

Table 4.2 Transport Rates (million cum)

Period	Northward	Southward	Net	Gross
SW monsoon	0.0795	0.511	-0.431	0.590
NE monsoon	0.021	0.016	0.0057	0.037
Non-monsoon	0.025	0.025	0.0	0.05
Annual	0.118	0.531	-0.413	0.649

4.6.3 The net transport is towards south. It is also observed that the major southward transport occurs during SW monsoon.

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4.7 Shoreline Evolution

4.7.1 The model was run with the schematic layout for a period of 10 years. As the net transport is directed towards south, the deposition on the north side of the extended groyne is noticed while on the southern side erosion is observed.

4.7.2 Further, model was simulated subsequently for a period of 2, 4, 6, 8 and 10 years and the maximum cross-shore advancement for each period would be obtained as 34 m, 44 m, 52 m, 60 m and 68 m respectively from the prevailing coastline position on the northern side of the proposed north breakwater. Further, the corresponding long shore effect of deposition was felt for a length of about 2500 m. The maximum cross-shore erosion of the shoreline in 10 years period would be of the order of 40 m south of the southern breakwater with long shore effect would occur upto about 1500 m from the proposed position of the southern breakwater.

4.8 Conclusions of Study

4.8.1 The final layout for the fishing harbour was decided based on the layout options proposed based on wave tranquillity study. An open sea harbour with north breakwater of 1150 m length and south breakwater of 425 m length is adopted as the final layout.

4.8.2 The net long shore transport is towards south. Also, the major southward transport occurs during SW monsoon. Deposition is expected on the north side of the proposed northern training wall. The corresponding long shore effect on northern side of the proposed northern breakwater would be felt up to 2500 m.

4.8.3 In 10 years period, erosion on the southern side of the proposed southern breakwater would be limited up to 40 m in cross-shore direction and its effect in longshore direction would be extended up to 1500 m in the south of the proposed southern breakwater.

4.8.4 The sedimentation pattern for the proposed condition shows sedimentation of the order of 0.045m per annum near the river mouth. Sedimentation is also noticed near the north and the south breakwaters (0.05 m in a year). In the fishing harbour area sedimentation of about 0.03 m in a year is estimated.

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4.8.5 If the erosion on the south side of the proposed fishing harbour is progressive after the development then a suitable shore protection measure in the form of a seawall or series of groynes may be provided.

4.8.6 If the shifting of the river mouth is pronounced after the proposed development of the river training works then a seawall of appropriate length may be provided to arrest the shifting of the river mouth.

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5. SMART INFRASTRUCTURE AND AUTOMATED SYSTEMS

5.1 Introduction

The Third Industrial Revolution or Digital Revolution refers to the technological progress from analogue circuits and mechanical devices to the digital technology we use today. In the late 1990s and 2000s, the Information Technology (IT), with its high performance and low cost of computers and high capacity and speed of communications such as the Internet, contributed greatly to the efficiency and globalisation of transactions. In the 2010s, IT has shifted to the Information and Communication Technology (ICT), emphasizing the importance of communication technology between people and between people and things, and the sharing of information and knowledge through network communication. ICT includes not only traditional communication devices such as PCs and smartphones, but also the Internet of Things (IoT) and the use of big data. Advances in the Third Industrial Revolution have made human intellectual work more efficient.

The Fourth Industrial Revolution is characterised by emerging technological innovations in areas as diverse as robotics, AI, nanotechnology, biotechnology, quantum computing, IoT, 3D printing and virtual reality. In recent years, the widespread use of the Internet and high-speed communications in all areas of the industry, society and life has led to the connection of people through PCs, smartphones and tablets, and also to the connection of things through the IoT. In addition, services with a variety of applications are becoming more readily available. In particular, developments in robotics and AI technology have the potential to change the way we work. The Digital transformation (DX), the concept that digitization changes social life, the economy and business for the better, is being promoted.

5.2 Objectives and effects of ICT and IoT utilization

Electronic auctions have long been widespread in fishing harbour markets, and online auctions are now available from anywhere in the world, without the need to visit the market. The website of the fishing harbour provides not only information about the auction, but also about the restaurants in the harbour and its surroundings. Good information spreads quickly through social networks. The number of personnel at the auction hall is also decreasing. There are PCs in the administration office, and

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communication with buyers and masters or owners of fishing boats is done via the internet rather than by telephone. Automatic sorting and grading machines are used for certain species of fish, as it is difficult to sort and grade fish manually. ICT, IoT utilization refers to the computerization of information from paper form to electronic form and the internet of people and things. In this way, ICT, IoT utilization can be seen in the operation of fishing harbours, and the use also seems to be reaping the benefits of these technologies.

The followings are the objectives and effects for which ICT and IoT are used so that fishing harbours can fulfil their roles and functions properly:

i Ensuring transparency, parity and fairness;

Dissemination of information via the internet & website, etc.

ii Efficiency in sales operations;

Weighing scale, sorting & grading machine, electronic auction, etc.

iii Maintaining and increasing sales;

Greater participation of buyers, including from outside the local, through electronic and online auction

iv Ensuring safety and quality;

Labelling, electronic record for the HACCP system, etc.

v Ensuring resource management;

Electronic recording and reporting catch and sales information, etc.

vi Ensuring traceability and sustainability;

Electronic issue of invoices and labelling, etc.

vii Improving safety of navigation and fishing operation; and

Electronic information, etc.

viii Efficiency in financial management, etc.

Electronic record

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5.3 Dissemination of information via the internet & website

A fishing harbour is the base of the fishing industry, where the catch is landed and sold, and where processing and distribution are concentrated. People involved in the fishing industry want to be able to access information about the fisheries, the fishing industry and the fishing harbour. On the other hand, the administrator and operator of the fishing harbour and market are required to ensure transparency, fairness and equity in their administrations and operations. These imply the importance and necessity of disclosure and provision of information.

5.3.1 Internet & website

As a method of disclosure and provision of information, it is appropriate to make use of ICT, which is widely used in industry and daily life. The administrator and operator use the internet to set up a website, post information on the website, and make the information available to users. Confidential information, which is inappropriate for disclosure and which identifies the user, can be made accessible only to users who registered in advance and enter your ID and password in the dedicated login.

5.3.2 Contents of information

The information provided on this site is broadly classified into the following categories: information about the Harbour Authority, information about the fishing harbour, information about the fishing industry, information about the market, information about safety and quality of fish and fishery products and other useful information. The users of the information include fishermen, buyers and other traders, processors, transporters and suppliers of ice and oil. Depending on the nature of the information provided, the users of that information also differ.

In the case of a harbour authority setting up a website, the following is a list of appropriate contents of the information:

1 Harbour administration’s information

- Mission
- Organization (Organizational structure, board members, staff)
- Documents (Annual financial plan and report)

2 Harbour information

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- Roles or functions (Roles or functions of harbour and market)
- History (History, development of harbour)
- Layout of harbour facilities (Breakwaters, quays, waterways, basins, handling hall, auction hall, administration office, freezing and refrigeration facilities, buyer's warehouses, parking lots, fishing vessel building and repair yard, fishing gear drying ground, processing factories, logistic terminal, etc.)
- Hinterland (Fishing communities or town)
- Harbour services (Landing fish, idling vessels and preparing for fishing, cranes and hosts for fish landing, fishing vessel building and repair yard (boatlift, slipway, dry dock), ice supply, water supply and fuelling, lending and collecting fish boxes, fuelling facilities, etc.)
- Rules for use of harbour facilities and services

3 Fisheries information

- Types of fisheries (Fixed-net fishery, purse sein fishery, trawl net fishery, etc.)
- Fishing fleet (Overhaul length, horsepower, gross tonnage, types of fisheries, fishing grounds, etc.)
- Fish and fishery products (Fish caught, landed or unloaded, auctioned, processed fishery products)
- Fishery product processing and marketing

4 Sales information

- Collection of landings (i.e. landing station or landing point)
- Auction (How the auction works, landing times, auction days/times).
- Fishermen (Register (ID and password), How you can provide landings information. fees and charges, rules and forms)
- Buyers (Register (ID and password), How you can buy fish at the auction. fees and charges, rules and forms)
- Expected landings (Catch method, species, grade, volume (number of boxes), download or print out of PDF, Excel file or CSV file)

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- Today's sales catalogue (Fishing boat's name or number, catch method, species, grade, volume (number of boxes), download or print out of PDF, Excel file or CSV file)

- Prices (Sales date, fishing vessel, species, grade, volume (number of boxes), maximum prices, average prices, download or print out of PDF, Excel file or CSV file)

- Services (Sorting, grading and weighing, ice supply, clean water supply, fish boxes, packing and shipping purchased fish and fishery products)

- Documents (Invoices, landing statements, etc.)

5 Safety and quality of fish and fishery products

- Quality management

- HACCP system (Videos and photos)

6 Fish resource management

7 Fisheries statistics

- Weekly, monthly and yearly landings

- Download or print out of PDF, Excel file or CSV file

8 News & topics

9 Practical information

- Meteorological and oceanographic information

- Traffic information

10 Contact

5.4 ICT, IoT-utilized sales

5.4.1 Recording, reporting and transmitting information on the catch and trade

Figure 6.1 shows the EU and US system for recording, reporting and transmitting information on the catch and trade of fish and fishery products to ensure fisheries resource management. An auction hall located at a fishing harbour is the first sale point where fish and fishery products received from producers are sold to buyers (processors or distributors), and is the only place (database) where catch and sale information can be accurately recorded.

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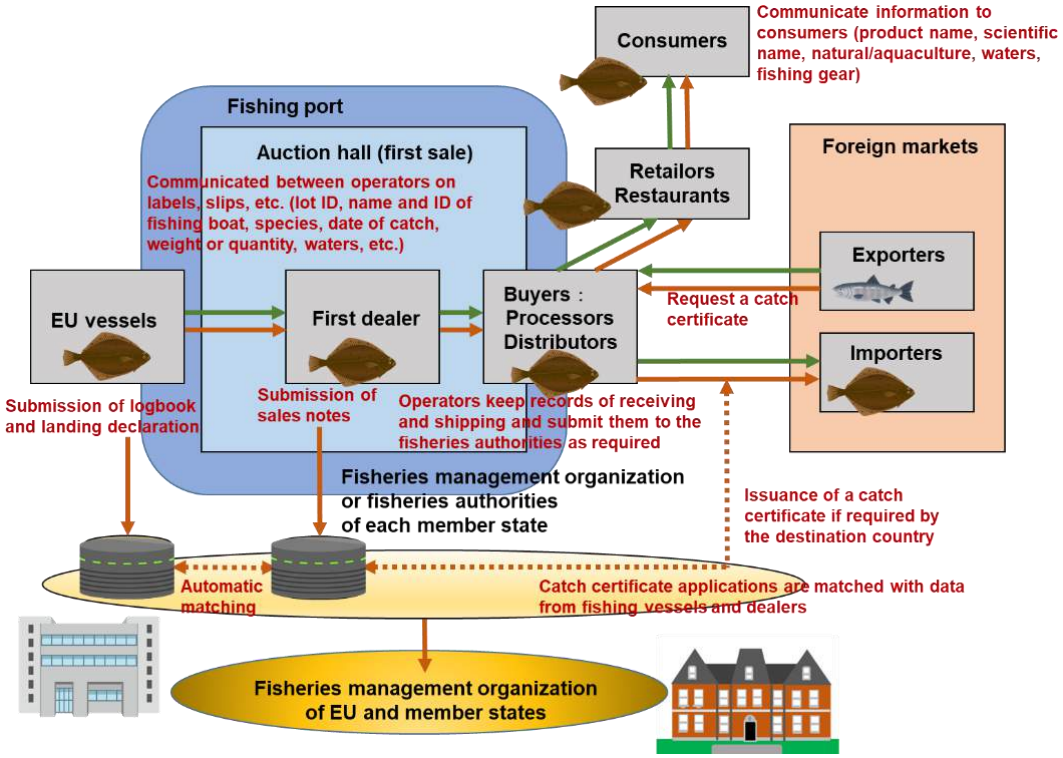


Figure 6.1 EU system for recording, reporting and transmitting information on the catch and trade

Figure 6.2 shows how ICT and IoT are utilized in the EU system. ICT, IoT utilization in sales means not only the electronic auction, but also the entire process of reporting catch information to the fisheries authorities and providing it to the market, landing at the fishing harbour and bringing it into the market, washing, sorting & grading, weighing, auctioning, delivery, shipping, issuing invoices (landing statements) to producers and bills (sales notices) to buyers, and reporting the results of sales (sales notes) to the fisheries authorities (or fisheries management organization).

The key to this computerization is a database in which the information on catch and sales is automatically recorded, through the electronic auction. Documents such as sales notices and the reports such as sales notes can be automated by pulling the necessary information from the database. The database can also facilitate the issuance of catch certificates and the provision of traceability information, which is necessary when exporting fish and fishery products, with a high degree of reliability and speed.

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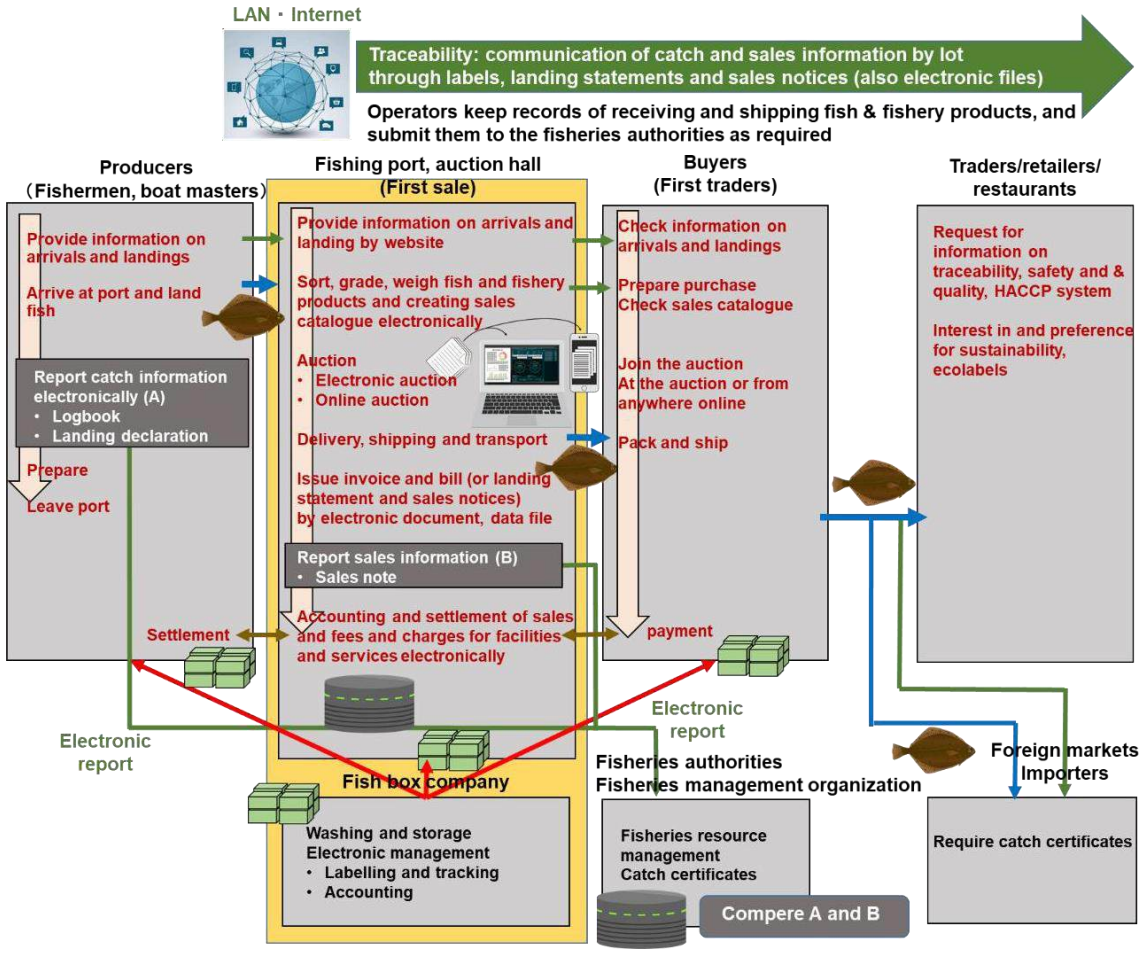


Figure 6.2 EU system utilizing ICT, IoT

5.5 ICT, IoT utilization according to sales process

5.5.1 Arrival of fishing vessels and landing information

Information on the date and time of arrival of fishing vessels and the landings is transmitted from the fishing vessels to the auction hall via the fishing vessel owner's office by telephone or internet the day before the sale or by the time of the auction. In some cases, reports to the fisheries authorities (or fisheries management organization) are also provided by the fishing vessels to the auction hall via the internet. Small fishing vessels operating day-trip coastal fishing catch a small quantity and variety of fish. So, small fishing vessels are not required to provide landing information to the auction hall. However, when the fishing vessels have catch larger than usual, they provide landing information to the auction hall by mobile phone.

The fishing vessels arrival information includes the fishing vessel's name, the date and time of arrival, the expected date of sale, the species of fish and the number of fish

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boxes or the catch. Landing information includes the name of the fishing vessel, species, grade, the number of fish boxes or the catch and also information on the species eligible for ecolabel fishery certification. This information is uploaded to the website, posted in the waiting & resting room for buyers, etc. of the auction hall. Figure 6.3 shows an example of providing arrival of fishing vessels and landing information on the website wet up by the Harbour Authority.



Berth	Vessel	Arrival		Market	Boxes	Gutted	Round
Harbour	TRANQUILITY PD35	04/09/21	01:00	06/09/21	164	4	0
Finger Jetty - West	ALTAIRE LK429	03/09/21	23:40				
Harbour	HELENUS FR121	03/09/21	17:45	06/09/21	480	80	0
Harbour	PHOENIX FR941	03/09/21	17:15	06/09/21	435	22	0
Harbour	FOREVER FAITHFUL PD289	03/09/21	13:45				
TJ	CHRIS ANDRA FR228	03/09/21	11:20				
Consignment	MORAY ENDEAVOUR BCK17	03/09/21	06:02	03/09/21	85	85	0
Consignment	FISHER BOYS FR54	03/09/21	06:01	03/09/21	67	67	0
Consignment	MACKEREL PD	03/09/21	05:45	03/09/21	114	114	0
Harbour	ATTAIN H332	03/09/21	04:35	03/09/21	402	7	2
Harbour	CASTLEWOOD H216	03/09/21	04:25	03/09/21	400	5	7

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LATEST FISH LANDINGS

Vessel	Total Boxes	Cod	Monks	Haddock Lrg/Med	Haddock Sml	Haddock Sml Round	Whiting	Whiting Round	Saithe	Megrim	Squid	Hake	Lemons	Plaice	Witches	Ling	Others
PHOENIX FR941	435	17	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3
				124	206		13		14			53		3			
HELENUS FR121	480	20	0	0	0	0	20	0	0	0	0	0	0	0	0	5	35
				40	270				20			65		5			
TRANQUILITY PD35	164	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
					6	150						1		3			
SHALIMAR PD303	852	110	10	0	0	0	0	110	0	2	0	0	4	0	5	3	30
				65	355	25	25		55			50		3			
FALCON H119	861	89	7	0	0	0	0	110	0	4	0	0	3	0	3	5	55
				80	360	34	30		35			40		6			
VICTORIA MAY SF267V	715	65	130	13	13	15	0	3	281	0	0	12	0	0	0	38	145
EMULATOR SH83	193	111	9	0	0	0	2	0	0	0	0	0	4	0	2	1	11
				4	6				31			1		11			
STEADFAST HOPE BF340	190	15	30	0	0	0	10	55	0	0	0	0	0	0	10	2	3
					45				20								
Totals	3890	427	188	13	13	15	36	278	281	6	0	12	11	0	20	54	282
				313	1248	209	68		175			210		31			

MSC fish are shown in blue or shaded boxes. Vessels are responsible for the declaration.
Responsible Fishing Scheme certified vessels are highlighted in yellow.

Source: https://www.peterheadport.co.uk/

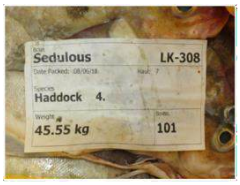
Figure 6.3 Arrival of fishing vessels and landing information, Peterhead, UK

5.5.2 **Landing and bringing in the auction hall**

On the day before or on the day of the scheduled sale, the fish are removed from the hold in fish boxes using cranes on board or on the quay and brought in the main building of the auction hall on forklifts or trolleys. Floating fish (pelagic fish) are taken directly from the hold to the tanks on the quay or into the main building by fish pumps or nets. The fish boxes and tanks are placed in a cold controlled area soon after landing to ensure freshness.

Figure 6.4 shows the labels on the fish boxes landed at Lerwick and Scalloway. The fish has already been sorted and weighed on board before landing and includes information such as fishing vessel's name, species and weight by fish box.

Figure 6.4 Labels attached to the fish boxes landed at the quays, Lerwick & scalloway, UK



Label in the fish box



Label attached to the fish box



Landing and bringing into the main building of the auction hall

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5.5.3 Sorting, Grading, Weighing fish and creating sales catalogue

5.5.3.1 Sorting and grading

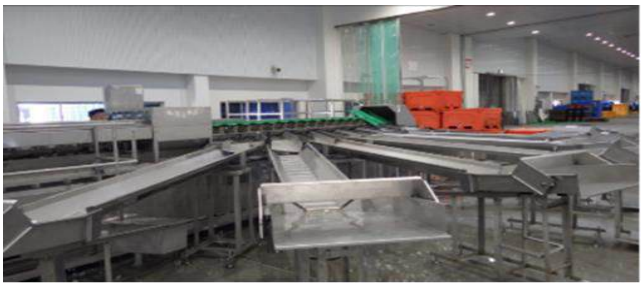
Catch may be sorted, graded and weighed on board (depending on the species, primary treatment such as gutting may be also carried out on board), and a label with their results (fishing vessel's name, catching area, species, grade, weight, etc.) attached to the fish box, as shown in Figure 3.4. The content of the label attached to the fish box is scanned and additional information such as the quality level added from a tablet/PC terminal. Even if fish are weighed in advance, the information on the label may be incorrect or the label may be unclear, and in order to ensure traceability with accurate information, fish are weighed on a sample basis by fishing boat, species and grade for check.

In the case where the catch has not been sorted, graded and weighed on board, the automatic fish species sorting machine may be used for horse mackerel and other species and the automatic fish grading machine may be used for flatfish, flounder, skipjack, salmon, etc.

Figure 6.5 shows the automatic grading machine at Scalloway, UK, and Figure 6.6 shows other examples.



Figure 6.5 Automatic grading machine for flatfish, Scalloway, UK



Grading machine for salmon
Ishinomaki, Japan



Grading machine for ??
Tarragona, Spain

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Figure 6.6 Other examples of automatic grading machines

5.5.3.2 Weighing and creating sales catalogue before auction

The fish box with fish in is placed on the weighing terminal and the catch information such as the fishing vessel's name and number, start and end dates of catch, catch area, and fishing method is entered from the panel of the weighing terminal as shown in Figure 6.7. The information such as species, grade in size, condition (fresh, frozen, etc.) and quality level and eco-label certification is also entered. The information is automatically sent to the server at the time of weighing, resulting in printing a label containing the information, which is posted on the side of the fish box or placed in the fish box. It is relatively easy to create a sales catalogue by drawing the necessary data from the server.

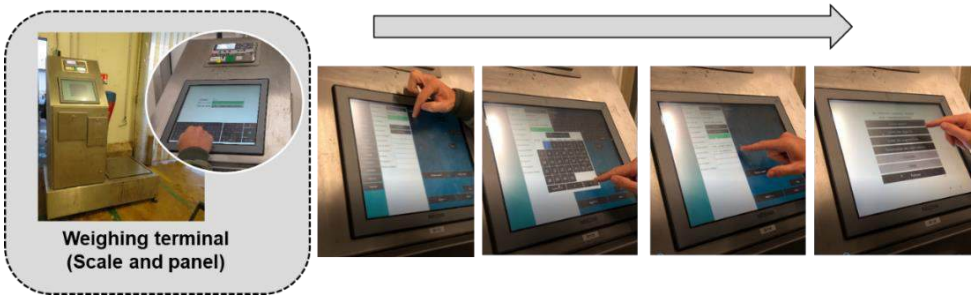


Figure 6.7 Weighing terminal, Boulogune-sur-Mer, France

The sales catalogue may be created by entering the information on the labels or slips (small sheets of paper) in the fish box from a tablet/PC terminal as shown in Figure 6.8. As most of the necessary information about the fish is defaulted, has to be actually entered from the weighing panel, or tablet/PC terminal. Sales catalogues are printed out and distributed to buyers, or pre-registered buyers can log in to the website to view, print out or download (as a PDF file).

Figure 6.9 shows the forklift with a tablet-mounted weighing scale and fish tanks with IC tags at Ofunato, Japan. RFID tags are attached to the fish tanks, one at the front and the other at the back of the tank. The weighing results by using a forklift weighing scale are linked to the tank number read from the RFID tag and sent to the server for recording. A tank of seawater or ice is pre-weighed and then the tank is weighed with the fish in it. By subtracting the weight of the former from that of the latter, the net weight of the fish is obtained.

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Figure 6.8 Creating sales catalogue, Skagen, Denmark

Figure 6.9 shows other examples of weighing scales with ICT, IoT utilized.



Figure 6.9 Forklift with tablet-mounted weighing scale and fish tanks with IC tags, Ofunato, Japan

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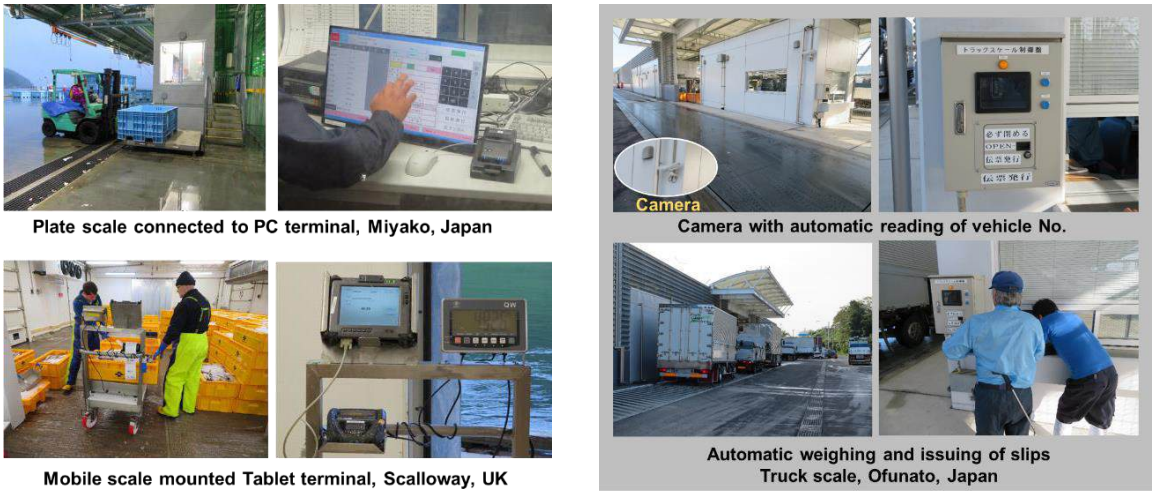


Figure 6.10 Other examples of weighing scales with ICT, IoT utilized

5.5.3.3 Weighing and creating sales catalogue in the course of auction

Fish boxes with fish in by fishing vessel are placed on the conveyor belt moving to the auction area. When the fish box reaches the scale on the conveyor belt, it is automatically weighed. Figure 6.11 shows the weighing and creating a sales catalogue at Lorient-Keroman, France. Market personnel enter the information about the fish other than the weight, resulting in creating a sales catalogue. The information for sale is shown on the screen or electronic display in the auction hall.



Figure 6.11 Weighing and creating a sales catalogue, Lorient-Koroman, France

Figure 6.12 shows the weighing and creating a sales catalogue while fish boxes with fish in are moving on the conveyer belt at Civitanova, Italy. In the cabin near the auctioneer, information such as the fishing vessel's name and number, catch area,

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species, grade in size, condition and quality level other than the weight are entered from a PC terminal, and a sales catalogue is created. The video footage of the fish and information for sale are shown on the screen in the auction hall. The auctioneer announces the quality of the fish to the cabin and the auction for each sales lot begins.



Figure 6.12 weighing and creating a sales catalogue while the products are moving on the conveyor belt, Civitanova, Italy

5.5.4 Auction

5.5.4.1 History of electronic auction

Electronic auction was first introduced in the late 1980s to save labour and time, improve efficiency and avoid manual errors. In the 1990s, PCs became more sophisticated and network connections, such as LANs, were used for more sophisticated work. The opening of the Internet, developed in the United States, to the private sector accelerated informatization, and from the mid-1990s the Internet spread rapidly throughout the world, enabling the instantaneous and interactive exchange of a large amount of information. Moreover, the development and widespread use of mobile phones has made it possible to exchange information from any location. This has led to the introduction of online auctions, where buyers from all over the country and the rest of the world can participate via the internet. The number of markets conducting online auctions has increased since 2000 due to the widespread availability of broadband and

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also the increasing use of smartphones in the 2010s. A web-based transaction system has also been launched.

As buyers may participate in the auction from all over the world, it is a prerequisite that a quality assurance system for fish and a delivery system from the auction hall are in place. For the quality assurance system, there are EU quality criteria and more detailed criteria set up by Scandinavia and other exporting countries. As for the delivery system, it must be punctual and ensure a cold chain up to the buyer's designated destination. The Nordic and Scottish markets, such as Norway, Denmark, the Faroe Islands and Shetland (UK), meet these requirements, and rely heavily on online auctions.

5.5.4.2 Classification of auctions in terms of the utilization of ICT, IoT

Auction is a very old tradition of selling or buying of products and services which allows the highest bidder to get hold of them. According to the extent to which ICT, IoT is used for computerization, automation and systematization of the auctions, they are classified as follows:

1 Conventional auction/manual auction (local auction/physical attendance auction);

The auctioneer starts the auction with a shout in front of the fish. In the case of an ascending auction, the buyer voices the price or indicates it with his finger. In the case of a descending auction, the auctioneer shall state the price and the buyer shall respond to it by voicing or gesturing.

2 Electronic auction (local auction/physical attendance auction);

Computers have been introduced to automate and systematize the auctioneering process. The information about the fish is displayed on an "auction clock" - electronic board or screen - , and the buyers join the auction while looking at the fish. The buyer presses a key on a remote control or pad at the price he wants to buy. A computer network (LAN), has been set up, with wireless or wired connections between server, computers, remote controls and terminals. The information converted into database as the auction progresses would contribute to the automation and efficiency of the work that follows the auction, such as the issuance of invoices and sales notices.

3 Electronic auction (Online auction/internet auction/remote auction);

By connecting the auction hall’s computer network (LAN) to the internet, it is possible to participate in the auction in real time from anywhere in the world, without having to

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go to the auction hall (not physical attendance), as far as buyers have PCs, tablets or smartphones with an internet connection. It is also possible to participate in more than one auction or market simultaneously. This would lead to the more new buyers.

4 Electronic auction at the virtual market (first-price sealed-bid auction online); and

The virtual market is built in cyberspace and first-price sealed-bid auctions online take place. In the virtual market, the market in cyberspace, the producers (fishing vessels) at sea and buyers (processors) around the world are linked via the internet, and once each auction is completed, the fishing vessel goes directly from the fishing grounds to the processing plant designated by the buyer. In addition to the benefits of electronic auction, the separation of sales and logistics saves labor and time, and contributes to keep the catch fresh. On the other hand, it is noted that it is difficult to find a link with the function of fishing harbours.

5 Web transaction/negotiated transaction.

Via the internet, sellers and buyers negotiate with each other on the web and decide on items, prices and quantities in advance or at the auction.

With the utilization of ICT, IoT, auctions are held in different locations - display area, auction area, auction room, anywhere inside and outside the auction hall, virtual market.

5.5.5 Delivery, dispatch and transport

The fish auctioned off are checked by the market personnel for the contents of the labels in or on the fish boxes and are placed together in the designated area for each buyer, who has purchased them, where the fish are delivered from the market to the buyers. Then the fish are either dispatched from the auction hall by truck, carts or forklift as they are or, after packed.

The label contains catch and sales information that identifies the fish by lot, which is also necessary information to ensure traceability. Traceability information can be obtained in a variety of formats (PDF, Excel and CSV files) by reading it with a smartphone or other device from the barcode or QR code on the label on the fish box.

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Figure 6.13 and 6.14 show the labels and the information contained therein in or on the fish boxes at Giulianova, Italy, and at Gilleleje, Denmark respectively.

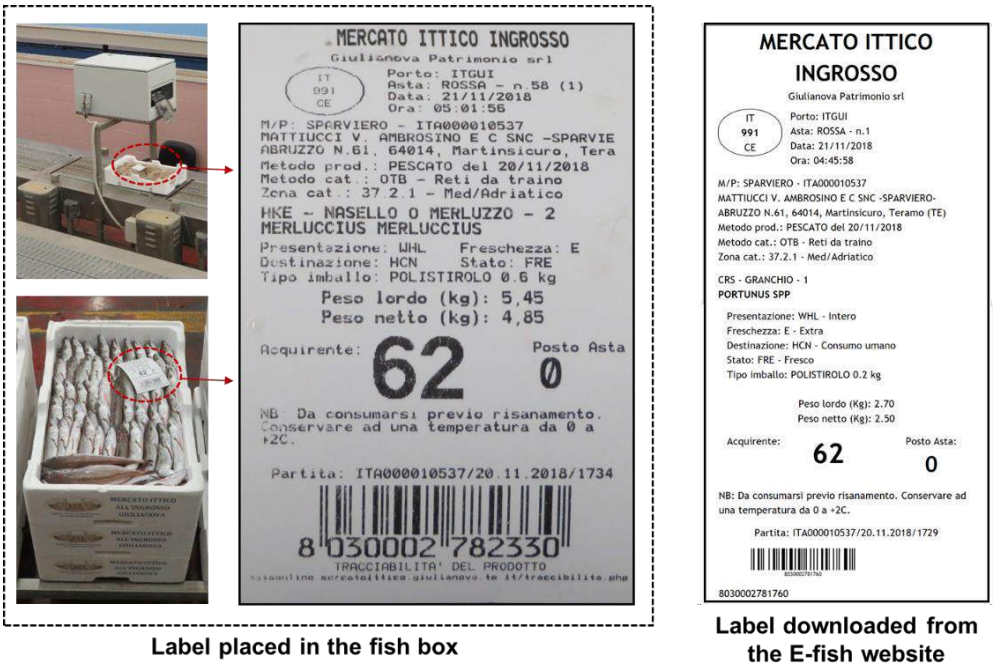


Figure 3.13 Delivery of fish with a label in the fish box, Giulianova, Italy

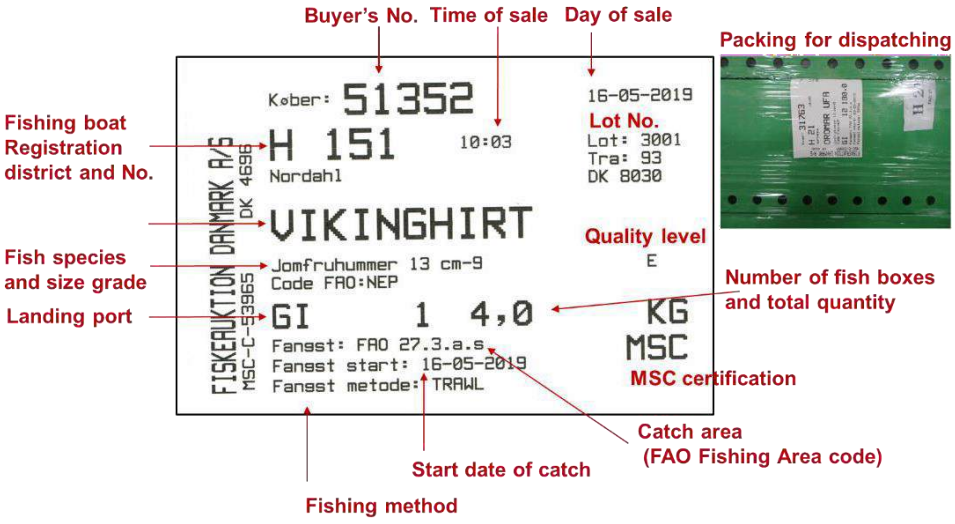


Figure 6.14 Delivery of fish fishery products with a label in the box, Gilleleje, Denmark

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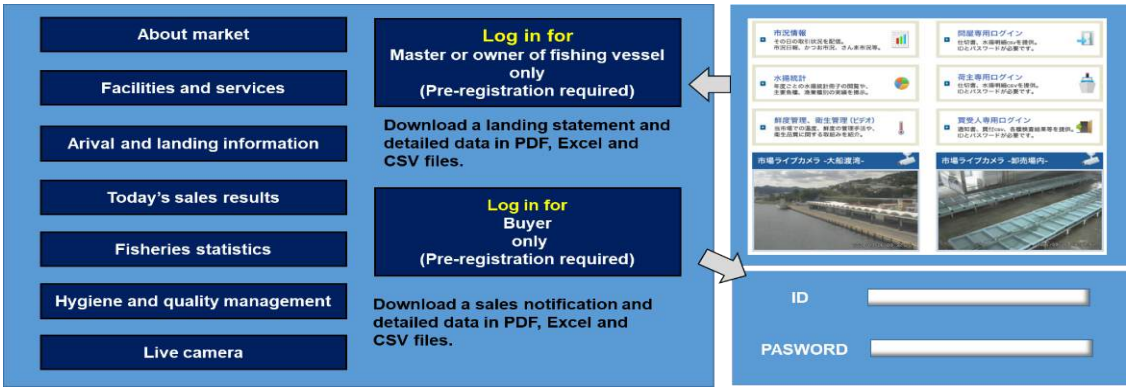
5.5.6 Issuing landing statements and sales notices

Information on the catch and sale is recorded electronically on the auction hall's server through the sales process. After the day's sales, landing statements to producers and sales notices (invoices) to buyers are automatically created by drawing necessary information from the server. A landing statement is a vessel-by-vessel list of which fish and have been purchased and by whom. A sales notice (invoice) is a bill for the fish purchased by the buyer.

Fishing vessel's owners or buyers receive these documents manually or electronically as follows:

- The market personnel print out the documents on paper and post them in the boxes of the buyers and the fishing vessel’s owners respectively;
- The personnel send the PDF file or other type of file to the buyers and the fishing vessel's owners by email; and
- Buyers and fishing vessel's owners log in the dedicated website to view and download them and detailed data in PDF, Excel and CSV files.

The day's sales results (fish species, grades, quality levels, prices, etc.) are uploaded on the website, soon after the auction.The landing statements and sales notices contain catch and sales information that identifies fish, and these documents can be recorded electronically by the vessel owners, buyers and market personnel to ensure traceability. Statistical information on the volume and value of sales by fish species and fishing method is reported monthly to the municipal and state statistical authorities and to the fisheries authorities. The accounting of commissions, charges, taxes associated with sales and other services is also computerized.

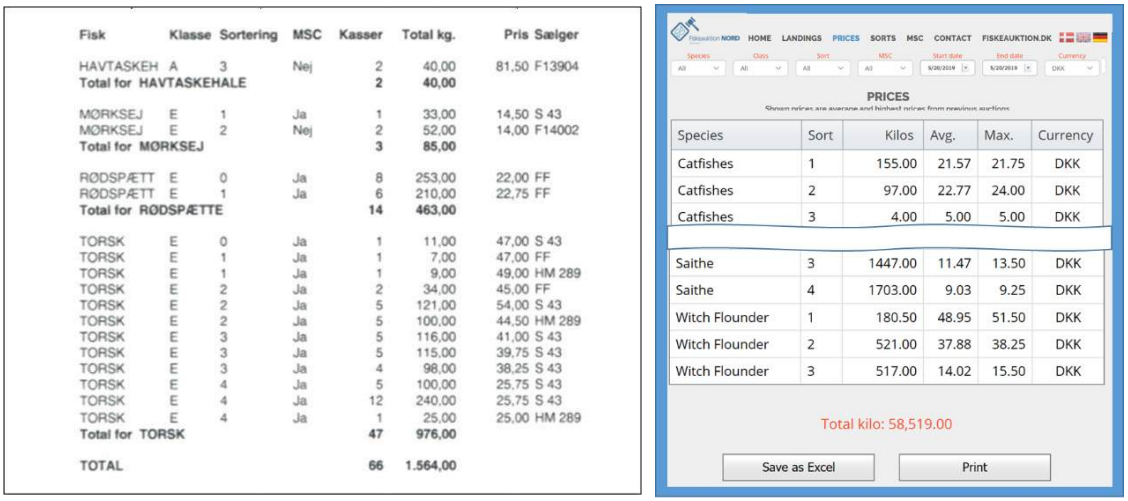


http://www.ofunato-fm.com

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Figure 6.15 Website for download of landing statements and sales notices, Ofuna, Japan



Fisk	Klasse	Sortering	MSC	Kasser	Total kg.	Pris Sælger
HAVTASKEH	A	3	Nej	2	40,00	81,50 F13904
Total for HAVTASKEHALE				**2**	**40,00**	
MØRKSEJ	E	1	Ja	1	33,00	14,50 S 43
MØRKSEJ	E	2	Nej	2	52,00	14,00 F14002
Total for MØRKSEJ				**3**	**85,00**	
RØDSPÆTT	E	0	Ja	8	253,00	22,00 FF
RØDSPÆTT	E	1	Ja	6	210,00	22,75 FF
Total for RØDSPÆTTE				**14**	**463,00**	
TORSK	E	0	Ja	1	11,00	47,00 S 43
TORSK	E	1	Ja	1	7,00	47,00 FF
TORSK	E	1	Ja	1	9,00	49,00 HM 289
TORSK	E	2	Ja	2	34,00	45,00 FF
TORSK	E	2	Ja	5	121,00	54,00 S 43
TORSK	E	2	Ja	5	100,00	44,50 HM 289
TORSK	E	3	Ja	5	116,00	41,00 S 43
TORSK	E	3	Ja	5	115,00	39,75 S 43
TORSK	E	3	Ja	4	98,00	38,25 S 43
TORSK	E	4	Ja	5	100,00	25,75 S 43
TORSK	E	4	Ja	12	240,00	25,75 S 43
TORSK	E	4	Ja	1	25,00	25,00 HM 289
Total for TORSK				**47**	**976,00**	
TOTAL				66	1.564,00	

List of purchased fish and fishery products **Sales result**

http://www.hirfiskauk.dk/Prices

Figure 6.16 Purchase list printed out and sales results on the website, Hirtshals, Denmark

Figure 6.15 shows the website where landing statements, sales notices and their detailed data in PDF, Excel and CSV files can be downloaded at Ofuna, Japan. Today's sales results, and fisheries statistics also be downloaded. Within an hour after the end of the day's sale, landing statements and sales notices are issued, followed by the sales results uploaded.

Figure 6.16 shows the purchase list printed out and sales results at Hirtshals, Denmark. There is a printer in the auction hall, and when a buyer puts his chip on the sensor, a list of fish purchased up until now is printed out.

5.6 Service charges

To ensure safety and quality of fish and safety and efficiency of operations for sale, clean seawater, tap water, ice and electricity are consumed, and machine and equipment such as electric forklifts, carts, and grading machine are used. Users shall be properly charged, in accordance with the rules. The more electronically the information on users' charges are recorded in real time, and invoices and bills are issued soon, the more efficient operations are carried out and the more labor and time are saved.

Figure 6.17 shows the management system for forklift use and its electricity charges at Ofuna, Japan. Each time a user charges a forklift, information on its use is automatically

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recorded on a server in the central computer room. Users other than market personnel are charged according to their use of the forklift and the electricity.

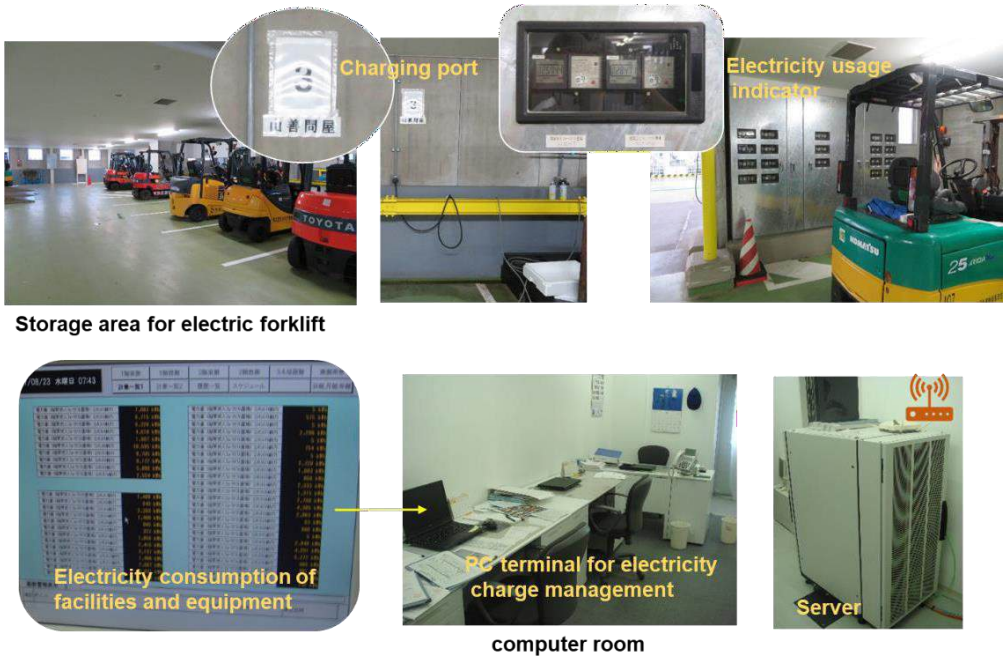


Fig. 6.17 Management system for forklift use and its electricity charges, Ofuna, Japan

5.7 **HACCP system facilitated by ICT**

At the auction hall where fish and fishery products are sold, the HACCP system is applied for food safety. Specifically, the auction hall is required to maintain and improve its structures & facilities, and machinery & equipment as well as provide guidance to users and maintain records of the measures taken to control hazards. As a part of the HACCP system, the person responsible draws up a management manual, which will be followed by the relevant personnel who will check the status of management at the control points and record the results in a record book (on paper generally). The person responsible finally confirms the results of the checks made by the personnel and keeps the record book.

Considering the limited number of personnel and their time, it is necessary to have a computerized system that can automatically manage the hygiene of people and vehicles entering and leaving the auction hall and fishing harbour, and easily record the results of hygiene management and provide them quickly upon request. The utilization of ICT in the control of the entry and exit of people and vehicles, and in recording the check results at the control points, can save personnel and time for the HACCP management.

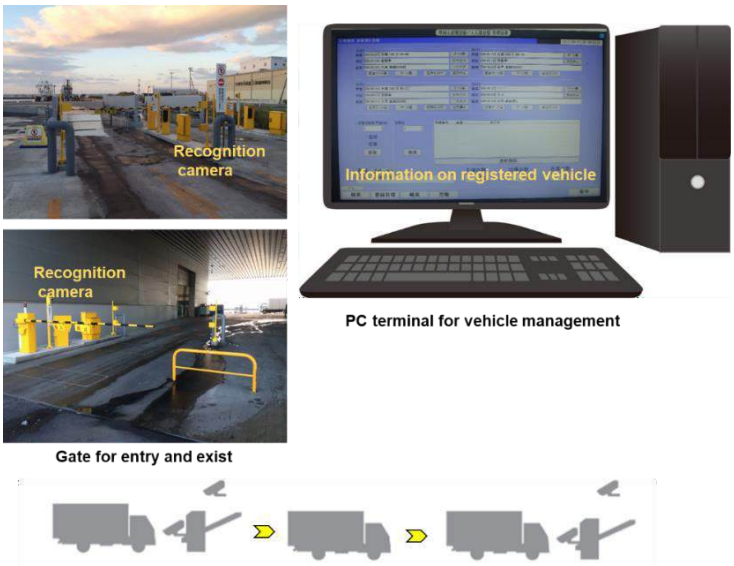
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5.7.1 Automatic entry and exit management system

The automatic entry and exit management system for vehicles automatically authenticates the vehicle at the gate to ensure that it is a pre-registered vehicle, and also works in conjunction with the car wash facilities and gate operation to automatically control the hygiene and safety of vehicles entering the landing and clearance area. The vehicle can be identified either by contact, using an ID card, or non- contact, using an automatic reading of the vehicle number. The system eliminates the need of assigning the personnel to control whether vehicles are entering the auction hall properly, and ensures that the auction-related people (market personnel, buyers, distributors and transporters, etc.) comply with hygiene management for vehicle entry.

Figure 6.18 shows the example at Ishinomaki, Japan. Vehicle entry and exit facilities using contactless transit cards have been installed at the gate of the access road to the quay, allowing only authorised vehicles to enter. When a vehicle enters or exits the quay, the number on the vehicle's number plate is read at the gate, and if the vehicle is not registered, it is either not allowed to enter or is checked by the market personnel using a live camera, and if there is no problem, it is registered before being allowed to enter. There is also a car wash area at the entrance gate after passing through the gate, where water is sprayed in conjunction with the gate to wash tyres. At this time, video footage of the tyre washing process is recorded.



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Figure 6.18 Automatic entry and exit management system for vehicles, Ishinomaki, Japan

The automatic entry and exit management system for people confirms that the person has been registered in advance and automatically carries out hygiene and safety control in the workplace by opening the entrance door to the workplace in conjunction with hand washing, hand disinfection, changing into boots and boot washing. There are two methods of automatic authentication: contact method using ID cards and non-contact method using automatic reading of ID cards.

Figure 6.19 shows the example at Ishinomaki, Japan. All those entering the auction hall are required to wash their hands, disinfect their hands and wash their boots in the access control room, and only those who are authorized by ID authentication are allowed to enter. The washing of hands and boots is recorded on video.



Figure 6.19 Automatic entry and exit management system for people, Ishinomaki, Japan

5.7.2 **Camera system**

By placing cameras at various locations in the fishing harbour, including inside and outside the auction hall, the use of the fishing harbour such as the arrival, landing, anchoring and preparation for departure of fishing boats, the sales situation in the market, as well as the hygiene management status can be centrally monitored, recorded in real time from a PC terminal in the office.

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Figure 6.20 shows the centralized surveillance camera system at Akkeshi, Japan. Twenty-three cameras are installed in the fishing harbour, and PC terminals in the administration office allows the harbour and market personnel to view video footage in real time, as well as video footage automatically recorded on a server for the past two weeks. These images are used to check the entry of suspicious persons and non-authorized vehicles.

Figure 6.21 shows CCTV installed along the auction lean, Tarragona, Spain. Although there are differences in system structure and function between CCTV and surveillance cameras, both are installed and centrally controlled to monitor harbours and check the safety of operations in markets and other areas.



Figure 6.20 Surveillance cameras installed throughout the fishing port, Akkeshi, Japan



Figure 6.21 CCTV instolled along the auction lean, Tarragona, Spain

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Figure 6.21 shows CCTV installed along the auction lean, Tarragona, Spain. Although there are differences in system structure and function between CCTV and surveillance cameras, both are installed and centrally controlled to monitor harbour and check the safety of operations in markets and other areas.

5.7.3 Electronic recording for HACCP management

In accordance with the HACCP system, the relevant personnel check the hygiene management status at the control points and enters the results on the spot from the tablet terminal and records them on the server. The recorded information can be retrieved from the server by the person responsible for the hygiene management, hygiene controller, at any time, from anywhere, using a tablet or PC terminal, for final verification and storage.

5.8 Electronic information for traceability

Figure 6.22 shows a sales plate with traceability information, Spain. In response to growing consumer interest, retailers are selling fish with plates containing not only the price but also information on where and how the fish was caught, under the initiative of the Catalan Consumer Agency.

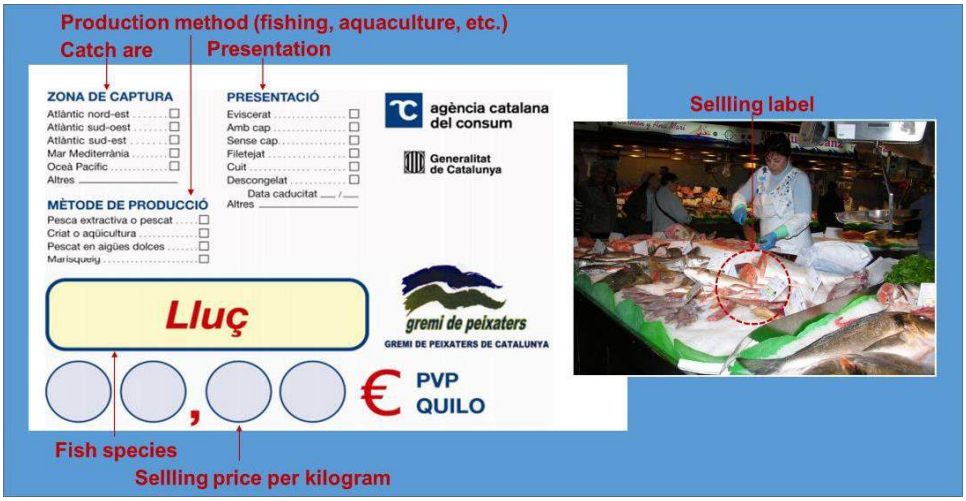


Figure 6.22 Sales plate with traceability information, Spain

The EU is described here as an example of how the necessary information is created, recorded and transmitted electronically in order to ensure traceability.

Lot-based traceability is the basic principle, and traceability information is transmitted on labels or vouchers by stating the lot ID, name and ID of the fishing vessel, species,

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catch date, weight or quantity, and catch area, etc. as shown in Figure 6.22. This also applies to aquaculture products. In the case of lot consolidation or lot split, the original lot ID corresponding to the new lot should be recorded.

Traceability information on the fishery products is recorded and stored electronically to the market's database through the sales process. The labels, landing statements, sales notices and other documents are completed and issued electronically. Since the auction hall is the starting point for traceability, the ICT and IoT - based sales process at the first sale of the fishing harbour contributes greatly to the establishment of precise and efficient traceability information towards the end consumers.

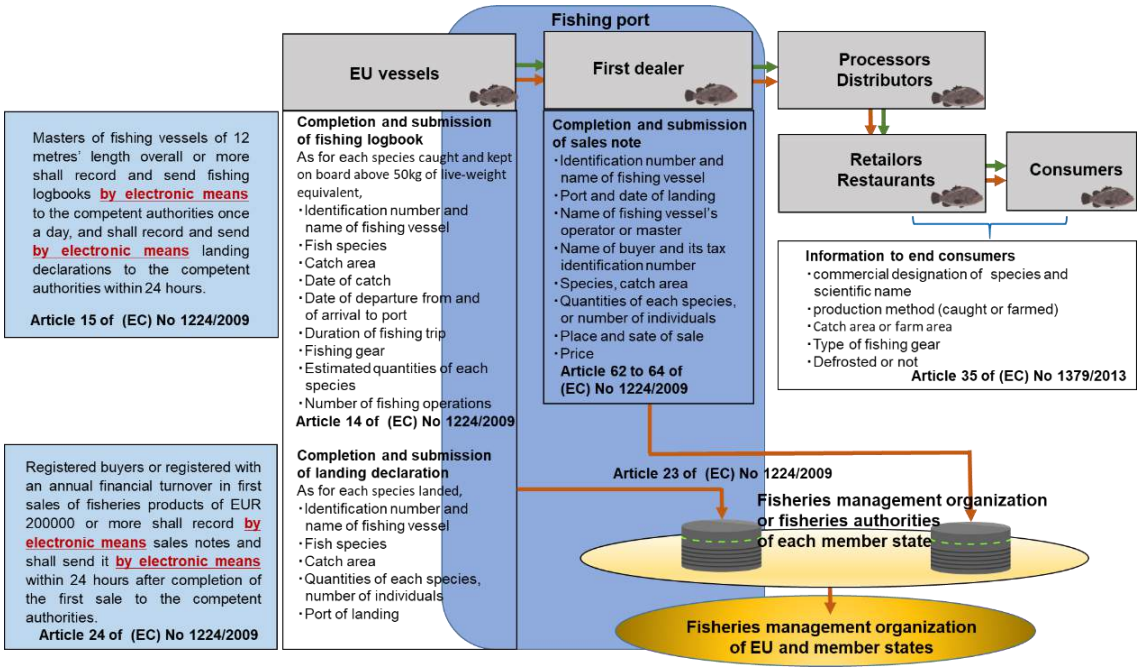


Figure 6.22 Recording, transmitting and displaying information on fish (fishery products)

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6. PROJECT COMPONENTS

6.1 Construction of Breakwaters

6.1.1 The Ajanur fisheries village is spread over five wards of Ajanur Gram Panchayat and the construction of this breakwater will be a great relief for the fishermen families in Ajanur as protection against high wave actions, adverse flow conditions near the entrance channel and wave breaking at low tides while manoeuvring their trawlers /boats.

6.1.2 This estimate is prepared for the construction of Breakwater at Ajanur, Chithari Kadappuram. The major components are Northern Breakwater of 1150 m length, Southern breakwater of length (425 m).

6.1.3 5 kg to 20 kg category stones of approved quality is proposed for the filter layer. Core of the breakwater is proposed to be constructed using 20 to 50 kg and 20-100kg category stones. Stones of 50-100kg,100-200kg, 200-300kg,500kg-1T category are proposed for secondary armour,2 to 3T and 500kg-1T category stones for berm or scour protection and2T, 6T tetrapods at sea side at trunk portion and 8T tetrapods at round head is proposed. At the leeward side 500 kg-1 T and 1T-2T category stones are proposed category stones for the primary armour layer. Crest width of 6.0 m at trunk and9.0 m at head is provided.

6.1.4 Total cost for this component comes to **Rs. 121,60,00,000** including 18 % GST.

6.2 Construction of River training work and dredging near the river training area

6.2.1 A river training work of Chithari River in the form of a beak water of length 432 m is proposed. River training work is proposed considering two major coastal processes: control of shitting and closing of Chittari River mouth due to sedimentation and southward littoral drift and littoral zone consideration.

6.2.2 5 kg to 20 kg category stones of approved quality is proposed for the filter layer. Core of the breakwater is proposed to be constructed using 20 to 50 kg and 20-100kg category stones. Stones of 50-100 kg,100-200 kg, 200-300 kg,500 kg-1 T category are proposed for secondary armour, 2 to 3 T and 500 kg-1 T category stones for berm or scour protection and 2T, 6T tetrapods at sea side at trunk portion and 8T tetrapods at round head is proposed. At the leeward side 500 kg-1T and 1T-2T category stones are proposed category stones for the primary

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armour layer. Crest width of 6.0 m at trunk and 9.0 m at head is provided.

6.2.3 Dredging is proposed in between the north break water and river training work at the mouth of River Chithari on an average 100 m width and 350 m length. It is proposed to dredge the area to a level of -3.0m.

6.2.4 Total cost for this component comes to **Rs. 32,60,00,000** including 18 % GST.

6.3 Dredging and Construction of Reclamation Bund

6.3.1 Dredging is proposed in the basin channel having average width 130 m and length 510 m It is proposed to dredge the area to a level of -3.0m.

6.3.2 The reclamation bund is proposed to be constructed along the basin for a length of 400 m. The bund shall have geotextile (120 grams per sqm membrane) in two layers including joints by stitching for bund along the basin dry rubble masonry with good quality blasted rubble for protection wall along the basin and with specified grade of reinforced cement concrete 1:1.5:3 is proposed for protection wall. Beneath the geotextile layer a layer of 6 mm stones, 20 mm stones and a core of 10 to 20 kg stones are provided respectively. The reclamation bund along the basin has a base width of 400 cm and top width of 115.9 cm, and has a height of 550cm. Provision for 180 RCC guard pillars is given.

6.3.3 Total cost for this component comes to **Rs. 6,24,00,000 including** 18 % GST.

6.4 Construction of Wharf and Auction hall

6.4.1 A 120 m long wharf with a width of 6.60 m for 60 m length and 5.00 m width for remaining 60 m length is provided for landing, berthing, and repair of fishing vessels. The beams and deck slab of wharf is proposed to be constructed of M-30 design mix using HCR reinforcement andM-35 bored cast-in-situ concrete piles of 750 mm diameter and 27.35m length is proposed as foundation for wharf. Facia wall of 1.5m depth is also provided. Wearing coat on deck slab is proposed using cement concrete 1:1.5:3 using 15mm broken stone for wharf.

6.4.2 Auction hall is of size 60 x 15 m is proposed on the rear side of the quay wall along landing area. The auction hall shall have RCC pile foundation with cast in situ concrete piles of M-35 grade, beams and slabs at floor level is made of M-30 design mix and with TMT bar of grade Fe-500D or more. 1.2 m long. Provision for column of size 40x 40 cm along with sloped roof of thickness 17.5 cm

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supported on longitudinal and cross beams of grad M 25 are provided. Provision for centering and shuttering, all cement plastering of mix 1:3, first quality ceramic glazed wall tiles for auction hall columns, industrial floor tiles, all painting works of required shade etc. also included in this proposal.

6.4.3 Total cost for this component comes to **Rs. 5,91,00,000** incl. 18 % GST.

6.5 Construction of Canteen, Rest shed, Locker room and Gear shed

6.5.1 Atwo-storied building of overall size 45 m x 10 m is proposed to accommodate net mending shed, shops and locker room in ground floor and canteen and rest rooms in the first floor. Net mending shed of size 23.2 m x 10 m is proposed in the ground floor. 5 locker rooms and 5 shop rooms of size 3.10m x 3.50 m size is proposed in the ground floor. A canteen of size 23.2 m x 10 m is proposed in the first floor along with 10 rest rooms of size 3.10m x 3.40 m. Head room of height 300cm is proposed.

6.5.2 The building shall have concrete isolated column footing over coconut piling work and rubble packing. PCC bed of nominal mix 1:4:8 is to be provided for walls, beams, floors etc. RCC belt is provided for long and cross walls. Random rubble masonry with hard stone is proposed upto plinth level and superstructure shall be of solid block masonry using pre cast solid blocks. RCC of nominal mix 1:1.5:3 for footing and plinth beam. RCC of nominal mix 1:1.5:3 for columns. RCC of nominal mix 1:1.5:3 for beams, roofs, lintel, and sunshade works, in ground and first floor. Fe 500-D and above grades steel is used in RCC works upto plinth level and upto floor five level. Rolling shutters of approved make is proposed for all rooms of first floor and stair room. Teak wood work is proposed for frames of doors and windows. Vitrified floor tiles in different sizes is proposed for flooring works in shop room, locker room, veranda, canteen, rooms and textured industrial 12mm thick floor tiles of first quality is proposed for flooring works in net mending shed. Provisions for centering and shuttering, plastering works, all painting works is also included in this proposal.

6.5.3 Total cost for this component comes to **Rs. 2,49,00,000** incl. 18 % GST.

6.6 Construction of Compound Wall and Side Protection Works

6.6.1 The compound wall is proposed to be constructed of laterite masonry with neatly dressed laterite stone of size 30x20x20cm. RR masonry of hard stone is proposed

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for foundation. The side protection works shall have foundation with coconut piling work with 30 cm thick and 80 cm wide dry rubble masonry above it. Superstructure shall be of gabion structure with mechanically woven double twisted hexagonal shaped wire mesh gabion boxes along with geo-textile filter between pitching and embankment slopes, to prevent escape of the embankment material through the voids of the stone pitching.

6.6.2 Nominal mix CC-1:3:6 is proposed up to plinth level and CC-1:2:4 above plinth level for compound wall and as belt over protection work along with guard pillar. TMT bars of grade 500-D and above provided as steel reinforcement for works up to plinth level. Provision for excavation, 12 mm cement plastering, water thinnable cement primer and finishing walls with water proofing cement paint of required shade are also included in this proposal.

6.6.3 Total cost for this component comes to **Rs. 6,14,00,000** including 18 % GST.

6.7 Gate and Gate House

6.7.1 To provide security to the harbour area and to facilitate toll collection it is proposed to construct a gatehouse. The gate house is proposed to accommodate toll booth and ATM counter of size 2.4 x2.4 m each. The gate is supported by two main pillars (0.9x0.3m) and the top portion is decorated by providing pergola which is made up of four long beams and five cross beams. Also the pergolas are covered by UV stabilised fibre glass reinforced plastic sheet for protection against harsh sun rays. The main gate of length 7m and two wicket gates of 0.9mon either side in steel are also proposed. Both the toll booth and ATM counter is provided with sloped roof. The column footing is proposed for main pillars.

6.7.2 PCC concrete of nominal mix 1:4:8 is proposed for works upto plinth level, dry stone packing with good quality blasted rubble is provided under foundation for pillars, walls and steps. RR masonry with hard stones is used in foundation and plinth. Solid block masonry using pre cast solid blocks of size 30x20x20 cm are to be used for gate house walls up to floor two level with 1:6 CM. RCC M30 mix is proposed for all components above plinth level and for column footing of gate house. TMT bars of grade Fe 500D or more used as steel reinforcement for R.C.C works for columns, lintel, roof slab and pergolas

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6.7.3 Total cost for this component comes to **Rs. 1,80,00,00** including 18 % GST

6.8 Construction of Internal Road, Parking Area and Drainage facility

6.8.1 A 4 m two-way internal road system is proposed to accommodate various type of vehicle entering and leaving the fishery harbour. The internal road is proposed to be made of MSS type A Bitumen S-65.Well graded GSB and WMM layer of 15 cm thickness is proposed over well compacted original surface. Prime coat, tack coat and Mix Seal Surfacing of total thickness 20 mm, 4 m wide and 370 m long of required quality is applied on main road. 30cm wide concrete kerb of nominal mix 1:3:6 is provided for the main road. Laterite boulder masonry with hard departmental stone is proposed for construction of boundary wall of main road. Granular Sub-base with Well Graded Material of 23 m x 42 m for parking area and 4 m wide for main road with 15 cm thickness for both is provided. TMT bars are provided as steel reinforcement in foundation.

6.8.2 Total area of4320 sqm is proposed for parking. The proposed parking area is to be constructed with PCC and RCCM25 of thickness 10 cm and 15 cm respectively with side drains for drainage. A nominal mix CC of mix 1:3:6 for parking area, drainage bed and side walls, and median kerb of the main road is to be provided. The drain is proposed to be made with concrete PCC bed, side walls, cover slab sand 5 cm thick levelling course. Guard stone of 15 cm height is proposed on the side of drainage and parking areaat 2m centre to centre.

6.8.3 Total cost for this component comes to **Rs. 2,82,00,000** including 18 % GST.

6.9 Toilet Block

6.9.1 Toilet block includes 4 w/c, counter room cum cloak room, courtyard, bath area and wash area. RR masonry is proposed in foundation with 0.15m thick PCC bed. Cement concrete flooring is to be provided. PCC bed of nominal mix is proposed for walls, beams, floors etc. RCC belt for long and cross walls is proposed.M30 grade RCC is proposed for lintels, beams, sunshade, staircase and roof. The building shall have concrete foundation, Random rubble masonry with hard stone upto plinth level and superstructure shall be of laterite masonry. Brick masonry manhole with RCC top and foundation is proposed. RCC roof slab of M30 mix is proposed.

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6.9.2 Total cost for this component comes to **Rs. 25,00,000** including 18 % GST

6.10 Approach Road

6.10.1 The proposed road work involves 950m length with 5.5m in width. There exists a partially damaged road having average width of 4m. The road starts from Kanhangad Kadappuram road junction and ends at proposed Fishing Harbour. This is the only one approach road to the fishing harbour, hence this road is also proposed as BM and BC road. For the entire stretches, black topping is proposed after filling base course of 15 cm thick WMM. The sub base is prepared by compacting the original ground supporting the embankment. Black topping work includes prime coat, tack coat, 5 cm thick BM and 3cm thick BC. Provisions for loosening and compacting, clearing grass, shifting of utilities and land acquisition are included in the estimate.

6.10.2 Total cost for this component comes to **Rs. 1,38,00,000** including 18 % GST

6.11 Work shop building

6.11.1 This9.8m x 9.8m building which includes contains office room, shop, an electrical workshop, a mechanical workshop, a crane facility and a workspace is proposed. 0.15m thick and 2m wide PCC bed of 1:4:8 mix is proposed for wall and column foundations. Random rubble masonry with hard stone shall be used in wall foundation and plinth. DR packing under foundation with good quality blasted rubble is provided. TMT bars of grade Fe-500D or above is proposed for RCC works upto Plinth level. Plinth beam of 0.45m thickness is proposed. Superstructure shall be constructed of laterite masonry with neatly dressed laterite stone of size 40x20x15cm. RCC belt for long and cross walls, RCC for column and its footing and M30 RCC for lintel, roof slab, sunshade, stair, ground and first floor beams is proposed to be constructed.

6.11.2 Total amount of estimate comes to **Rs. 46,80,000** including 18 % GST.

6.12 Construction of office room cum harbour surveillance camera room

6.12.1 A two storey building is proposed for office and harbour surveillance camera room having a plinth area of 299.2 m2. Ground floor contains office room, store room, rest room, 3 toilet, porch, entrance, stair room, and an open area for cabins. First floor contains an additional store room. It also includes provisions for a septic tank and soak pit. PCC bed of nominal mix is proposed for wall and

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column foundations. Random rubble masonry with hard stone shall be used in wall foundation. Superstructure shall be constructed of laterite masonry with neatly dressed laterite stone of size 40x20x15cm. RCC belt for long and cross walls, RCC for column and its footing and RCC for lintel, roof slab, sunshade, stair, ground and first floor beams is proposed to be constructed with concrete of specified grades. Plastering shall be 12 mm cement plaster of mix:1:4 and 1:3 for ceiling and shall be finished with approved paints. Doors, windows and ventilators shall be made of Aluminium. Glass panes shall be provided at the entrance, stair room and for office room for more provision of natural light.

6.12.2 Total amount of estimate comes to Rs. **89,00,000** including 18 % GST

6.13 Water supply arrangements in the harbour

6.13.1 Construction of a new O.H. RCC water tank and Sump for the Ajanur fishing harbour is planned for water supply having a capacity of 100000 litres. It has 60 cm diameter bored cast in situ pile foundation using RCC M 35 mix, lying below a 15 mm thick PCC layer of 1:4:8, a 75 cm thick M 30 RCC layer and 60 cm pedestal below GL successively. RCC columns of size 40X40 cm are provided and RCC water tank using M 30 mix at top in a frame supported by columns, beams and haunches. The beams are in three levels and are also proposed under the tank slab. An RCC cover slab is also proposed. Laterite masonry with neatly dressed laterite stones of size40x20x15 cm size is proposed for superstructure above plinth level upto floor 2 level. Steel ladders are proposed to provide access to the top for cleaning and maintenance functions. Plastering and suitable painting are also proposed. Provisions for distribution lines are also included. Masonry chamber as manhole is proposed. The construction of Pump House at bottom of the RCC tank is planned.

6.13.2 An RCC sump of 50000 litres capacity near the existing water tank is planned. The foundation of the sump is proposed over a dry rubble packing of 45 cm thickness. 15cm thick PCC 1:4:8 is proposed above it. It has an RCC bed slab of M30 grade. The base slab, 20 cm thick side wall and 15 cm thick covering slab is proposed. Laying of pipe lines for pumping and distribution is planned. Two gates with GI tubes and painting its surface with epoxy painting is planned. Necessary pump set and electrification will be done.

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6.13.3 Total amount of estimate comes to Rs. **1,89,00,000** including 18 % GST

6.14 Construction of Wharf for Berthing facility

6.14.1 A Berthing wharf of length 100 m and width 5m is proposed to be constructed near the south breakwater. The wharf is supported on 75cm diameter piles spaced at 6m effective span on length wise direction and 3.8 m effective span on transverse direction. Length of the proposed pile assumed as 27.35 m including 3.5m steel lining works. The deck slab of 20cm thickness is supported on longitudinal beams and cross beams of size 40x 80 cm. RCC M35 grade concrete is used for piles and M30 is used for beams slabs etc.

6.14.1 Total amount of estimate comes to Rs. **2,14,00,000** including 18 % GST

6.15 Effluent Treatment Plant

6.15.1 Lump sum provision of **Rs. 35.00 Lakh** is included in this estimate for construction of ETP.

6.16 Navigational Aid

6.16.1 Lump sum provision of **Rs. 2.00 Lakh** is included in this estimate to set up navigational aids in the harbour.

6.17 Pressure Washer and Cleaning Equipments

6.17.1 Lump sum provision of **Rs. 6.00 Lakh** is included for pressure washers, cleaning equipment, pump sets etc. All these were executed in various fishing harbours and the expenditure toward the same is included here.

6.18 Landscaping, Green Belt and Rainwater Harvesting

6.18.1 Lump sum provision of **Rs. 20.00 Lakh** is included in this estimate to set up facilities for landscaping, rainwater harvesting and green belt.

6.19 Mechanical conveyor system & Automation

6.19.1 Lump sum provision of **Rs. 150.00 Lakh** is included in this estimate to set up facilities for mechanical conveyor system & automation.

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6.19.2 Electrification and Installation of Solar energy system

6.19.3 Lump sum provision of **Rs. 250.00 Lakh** is included in this estimate to set up facilities for electrification and Installation of Solar energy system

6.20 Cost Estimate

6.20.1 The cost estimate for the project has been worked out with the help of PRICE software. Rate analysis for such projects is included for HED in the software. The quantities of various items of work for breakwaters are calculated from the areas of cross sections of the structure plotted in AutoCAD. CPWD schedule of rates with current cost index for Kasargod District is adopted for the cost estimate.

6.20.2 The general abstract of cost estimate of the project is shown below. The detailed cost estimate is appended to this report

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Table 6.1General Abstract of Cost

Sl No	Item	Quantity	Unit Rate in Rs	Amount in Rs
1	Construction of Breakwater at Ajanoor	1575m	772063.5	121,60,00,000
2	Construction of river training wall and and dredging near the river training area	Training wall-435m Dredging- 31000 m3		32,60,00,000
3	Dredging And Construction of reclamation Bund	Dredging - 132500 m3 Reclamation bund- 400 m		6,24,00,000
4	Wharf and Auction Hall	Wharf - 120 m x 6.6 m , Auction Hall - 60 m x 15 m Total 1692m3	34929.1	5,91,00,000
5	Canteen, Rest shed, Locker room, Gear Shed	45 m x 10 m (two Storey)	27666.7	2,49,00,000
6	Compound wall and Side Protection Works	Compound wall- 510 m Side protection- 1710 m		6,14,00,000
7	Gate and Gate House	2.4 m x 2.4 m ATM and Toll Booth each (area 47.16m2)	38167.9	18,00,000
7	Internal Road, Parking area and Drainage facility	Parking Area - 4320 sqm	3873.6	2,82,00,000
		Internal Road - 740*4 m		
8	Toilet Block	13.3*5	37594.0	25,00,000
9	Construction of approach road to fishing harbour	950 m	14526.3	1,38,00,000
10	Construction of workshop building	9.8*9.8 m	48521.4	46,80,000
11	Construction of office room cum harbour surveillance camera room	14.6*22.6 m (2 storey)	26851.7	89,00,000
12	Construction of wharf for berthing facility	100*5 m	42800.0	2,14,00,000
15	OH Tank and Water Supply Arrangement	As per estimate		1,89,00,000
14	Effluent Treatment Plant	LS		35,00,000
17	Navigational Facility	LS		2,00,000
18	Pressure Washer and Cleaning equipments	LS		6,00,000
19	Landscaping, Green Belt and Rainwater Harvesting	LS		20,00,000

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24	Mechanical conveyor system & Automation	LS	1,50,00,000
23	Electrification and Installation of Solar energy system	LS	2,50,00,000
		Total (A) including GST	**189,62,80,000**
Smart Infrastructure and automated systems			
30	Smart Technology Investments		
30.1	Procurement and installation of smart infrastructure components, such as IoT devices, sensors, communication networks, and data management systems including cost of hardware, software, and installation services.	LS	1,00,00,000
30.2	Development or customization of software for data management, analysis and visualization	LS	50,00,000
31	Communication and Connectivity		
31.1	Deployment of communication infrastructure, including internet connectivity, satellite communication systems, and wireless networks	LS	50,00,000
31.2	Implementation of networking equipment and cyber security measures	LS	50,00,000
32	Safety and Security Measures		
32.1	Investment in safety equipment (distress beacons and rescue drones)	LS	50,00,000
32.2	Installation of surveillance system including CCTV camera	LS	50,00,000
35	Provide charging stations for electric vehicles	L.S	10,00,000
36	Vehicle for installing IOT devices	L.S	35,00,000
		Sub total	**3,95,00,000**
		GST @ 18%	**71,10,000**
		Sub Total (B) including GST @ 18%	**4,66,10,000**
		Sub Total (C= A+B)	**194,28,90,000**
		Contingencies @ 3%	**5,71,10,000**
		Grand Total	**200,00,00,000**
Rupees Two hundred crore only			

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6.21 Source of Fund

6.21.1 The project is proposed under PMMSY. As per guidelines, the funding will be shared between Centre and State in the ratio 60:40.The sunken costs of surveys, investigations and model studies have already been incurred by HED. Major part of the project management cost shall be met by the department and the work charged establishment proposed in the DPR is only for the additional technical man power required for implementing the project.

6.22 Procurement

6.22.1 The project shall be implemented by HED by the standard procurement procedure in force in the department. Upon obtaining administrative approval for the project, the proposal shall be studied in detail and subjected to technical sanction from the Chief Engineer who is delegated with the powers for projects of such value. Agency for execution of the work shall be selected by way of inviting e-tenders with Pre- Qualification system. The bids are subjected to scrutiny of prequalification committee to select qualified bids. The statutory tender committee selects the best offer to arrive at a contract.

6.23 Implementation Schedule

6.23.1 A detailed WBS and program of work shall be formulated on real time basis on scheduling software during the technical sanction procedure to finalize the baseline schedule. At present, it is estimated that a period of 18 months is required for the implementation of the work.

Implementation Schedule

Construction of Ajanur Fishing Harbour

Sl No	Stages of Implementation	Month																									
		1st	3rd	5th	7th	9th	11th	13th	15th	17th	19th	21st	23rd	25th	27th	29th	31st	33rd	35th	37th	39th	41st	43rd	45th	47th	48th
1	Technical Sanction and Tendering																									
2	Construction of Breakwater at Ajanoor																									
3	Construction of River training work and Dredging near the river training area																									
4	Dredging And Construction of reclamation Bund																									
5	Wharf and Auction Hall																									
6	Canteen ,Rest shed, Locker room,gear shed																									
7	Compound wall and side Protection works																									
8	Gate and Gate House																									
9	Construction of Wharf for Berthing Facility																									
10	Internal Road ,Parking area and Drainage facility																									
11	Sewage treatment Plant																									
12	Water Supply Arrangement																									
13	Electrification																									

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6.24 Manpower Requirement and Capacity Building

6.24.1 HED has the necessary resources to carry out surveys, designs, estimation, scheduling, procurement and project implementation management. Each of the project location has a sub-divisional office headed by Assistant Executive Engineer to implement the project. The Divisional office at Kasargod headed by Executive Engineer and the North Circle office at Kozhikkode headed by Superintending Engineer shall be in charge of procurement, monitoring and control of the projects. Surveys and investigations are carried out by the HED Investigation & QC sub division, Vellayil.

6.24.2 The department has its offices and trained project resources to supervise the implementation of the project. The North Circle office at Kozhikkode will be doing the procurement process subjected to the approval of the tender committee. The division office in Kasargod District with the help of the Sub division offices shall be supervising the project execution and billing. Quality control is done looked after by the field office and monitored by the quality control subdivision. HED also has the change management system in place wherein any changes in scope, time and cost shall be regulated.

6.24.3 Thus, the department already possesses the required resources and expertise to carry out the project. The overhead on project formulation and management is borne by HED.

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7. ECONOMIC EVALUATION

7.1 Cost-Benefit Analysis

7.1.1 Economic viability depends upon the sustainability of project effects. Projects are sustainable if their net benefits or positive effects endure as expected throughout the life of the project. Sustainability is enhanced if environmental effects are internalized, and if financial returns provide an adequate incentive for project related procedures and consumers. The concept of financial profit is not the same as economic profit. The financial analysis of a project estimates the profit accruing to the project-operating entity or to the project participants, whereas economic analysis measures the effect of the project on the national economy. For a project to be economically viable, it must be financially sustainable as well as economically efficient. If a project is not financially sustainable, economic benefits will not be realised. Financial analysis and economic analysis are therefore two sides of the same coin and are complementary.

7.1.2 Fishing harbours and related infrastructures created are primarily meant for poor fishermen communities in respective locations and any development in this sector can be considered to be a service oriented one rather than a commercial one. However, if an economic analysis is carried out for any fishery related infrastructure or the like, the cost benefit accrued will be highly promising.

7.1.3 On detailed analysis, the cost-benefit ratio of Ajanur fishing Harbour comes to 1.37. The detailed cost-benefit analysis is provided in the appendix. The intangible benefits such as increased safety of fishermen’s life and property and general improvement in the overall working of the harbour is beyond a cost-benefit analysis and thus cannot be included. Considering the resources potential of the area, investment proposal of the project is found to be economically viable. The total project cost comes to Rs 20,000 lakhs. The amount can be met from PMMSY scheme.

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7.2 Project Risk Analysis

7.2.1 Risk identification, probability and impact of risks and risk response strategy are worked out to reduce negative risks and to harness positive risks. The risks identified and response strategy are listed below

Sl. No.	Risk	Positive/ Negative	Probability	Impact	Mitigation measure
1	Delay in statutory clearances	-ve	10%	Delay in commencement	Fast tracking of execution
2	Ban on mining during elections	-ve	25%	Delay in commissioning	Accept
3	Lack of competition in tenders	-ve	25%	Tender excess	Contingency reserve included in the cost
4	Hazards in execution in marine environment	-ve	10%	Delays	Risk transferred to contractor
5	Flood/ Hurricane	-ve	10%	Losses to structure	Accept the risk
6	Pandemics like COVID-19	-ve	10%	Delays	Accept the risk

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8. CONCLUSION

8.1.1 The proposal for the development of a fishery harbour at Ajanur is presented in this report. The main component of the proposal is extension of two breakwaters and river training work to create permanent tranquil basin for the safe landing of vessels in all seasons. The other facilities included are construction of wharf, auction hall, internal roads, parking area, loading area, water supply, electrification, drainage and sanitation arrangements, dredging etc. This project is absolutely necessary for the social and financial improvement of fishermen folk living in and around the proposed site. The total estimated cost for this project comes to Rs. 20000 lakh. This harbour construction will contribute to the socio-economic uplift of the area especially the downtrodden fishermen community and also provide employment to thousands of people both directly and indirectly. Considering the resource potential of the area and investment proposed, the project is found to be economically viable. The State Government requests the Government of India to sanction financial assistance for implementation of construction of Fishing Harbours under PMMSY.

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WHARF LENGTH CALCULATION

Landing, Outfitting, Repair and Berthing lengths

After considering the current fleet size operating from this area, the design fleet size of this harbour is arrived - motorised non- mechanical vessels - 553 Nos of 15m (avg length), motorised mechanical vessels -50 nos of 10 m (avg length) and traditional boats (non-motorised) - 30 nos of 8 m (avg length)

Of this, landing quay facilities are to be created for the MFVs, non MFVs and traditional vessels. Additional wharf lengths may be provided for landing, berthing and outfitting facilities for the MFVs, non MFVs and traditional vessels. The number of boats, length, annual average landing, etc. is given below in the statement form.

Overal vessel length (m)	Number of vessels	Fishing trips (days)	Fishing trips per year	Average daily landing
8	30	1	220	60
10	50	1	150	800
15	553	1	44	1136

The following assumptions are made while calculating the length of landing quays.

• At any time, 10% of the totals fishing fleet are not fishing due to maintenance, repair or any other reason.

• The vessels that go on 5 days trip will be equally distributed on each with same number of departures/ arrivals.

• Duration of fish landing hours in the fishery harbour will be 6 hours.

• An unloading rate of 4500kg/hour is assumed considering that the fish will be unloaded in fish baskets/boxes manually.

• During the peak month of the fishing season, some boats are expected to arrive with additional fish catch. Though this larger catch is expected to arrive only on a few days during the peak season, it has been safely assumed that daily on an average, 40% of the 8m vessels arrive in the peak hour with 20% additional fish catch, 20% of the 10 m vessels will arrive with additional 15 % increase in the fish catch. and 30% of the 15 m vessels will arrive with additional 10% increase in the fish catch.

Landing length for 15 m vessels: No landing length required as carrier vessels bring the catch to land.

Landing Length for 10 m Vessels on wharf				
Number of Vessels considered		=	50	
Number of boats operating per day (90%)	0.90x50	=	45	
Number of boats arriving in an hour (20%)	0.20x45	=	9	
Average fish landing / boat		=	800	kg
Peak landing per boat (+20%)	1.20x800	=	960	kg
Time required for unloading @4500/hr	960 x 60 / 4500	=	13	minutes
Time required for docking and undocking	2+2	=	4	minutes

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Total time required	4+13	=	17	minutes
Number of berths required to handle 8 vessels in one hour	9x17/60	=	3	Nos
Landing quay length required	3(10+1)	=	28	metre

Landing Length for 8 m Vessels on wharf				
Number of Vessels considered		=	30	
Number of boats operating per day (90%)	0.90x30	=	27	
Number of boats arriving in an hour (40%)	0.40x27	=	11	
Average fish landing/ boat		=	60	kg
Peak landing per boat (+20%)	1.20x60	=	72	kg
Time required for unloading @4500/hr	60x72/4500	=	1	minutes
Time required for docking and undocking	2+2	=	4	minutes
Total time required	4+1	=	5	minutes
Number of berths required to handle 140 vessels in one hour	11x5/60	=	1	Nos
Landing quay length required	1(8+1)	=	8	metre

Outfitting Length for 8 m Vessels

Number of boats requiring outfitting in a peak season per day	0.90x30	=	27	
Time required for each boat to receive fuel water and ice		=	10	minutes
Duration of outfitting hours		=	8	hours
Number of berths required for Outfitting	27x10/8x60	=	1	
Length of Outfitting required	1(8+1)	=	5	metre

Outfitting Length for 10 m Vessels

Number of boats requiring outfitting in a peak season per day	0.90 x50	=	45	
Time required for each boat to receive fuel water and ice		=	10	minutes
Duration of outfitting hours		=	8	hours
Number of berths required for Outfitting	45x10/8x60	=	1	
Length of Outfitting required	1(10+1)	=	11	metre

Outfitting Length for 15 m Vessels

Number of boats requiring outfitting in a peak season per day	(0.90*553) / 5	=	100	
Time required for each boat to receive fuel water and ice		=	10	minutes
Duration of outfitting hours		=	8	hours
Number of berths required for Outfitting	(100x10)/(8x60)	=	2	
Length of Outfitting required	2(15+1)	=	33	metre

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Berthing Length

Berthing length is provided for idle berthing of 20% of vessels after unloading their catch and before proceeding on a fishing trip. The remaining vessels can anchor innside the river for idle berthing during fair season. The vessels are assume to berth four abreast while idel berthing)

Berthing Length for 8 m Vessels

Berthing is provided for 20 % of vessels	0.20x30	=	6	
Assuming vessels berth 4 abreast. Number of berth required		=	2	
Landing berth available		=	1	
Outfitting berth available		=	1	
Number of berth to be provided	2-(1+1)	=	0	
Berthing required for 8 m vessels	0x(8+1)	=	0	metre

Berthing Length for 10 m Vessels

Berthing is provided for 20 % of vessels	0.20x50	=	10	
Assuming vessels berth 4 abreast. Number of berth required		=	3	
Landing berth available		=	3	
Outfitting berth available		=	1	
Number of berth to be provided	3-(3+1)	=	0	
Berthing required for 10 m vessels	0x(10+1)	=	0	metre

Berthing Length for 15 m Vessels

Berthing is provided for 20 % of vessels	0.20x553	=	111	
Assuming vessels berth 4 abreast. Number of berth required		=	28	
Landing berth available		=	0	metre
Outfitting berth available		=	2	metre
Number of berth to be provided	28-(0+2)	=	26	
Berthing required for 6 m vessels	26x(15+1)	=	409	metre

Repair length

Provide repair quay of 1 boat length

8 m vessel	8+1	=	9	metre
10 m vessel	10+1	=	11	metre
15 m vessel	15+1	=	16	metre

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Summary of waterfront length required					
Overall length of Vessels (m)	Landing length (m)	Outfitting length (m)	Berthing length (m)	Repair length (m)	Total length (m)
As per calculation					
8	8	5	0	9	22
10	28	11	0	11	50
15	0	33	409	16	458
Total					**530**

Annexure 17.2 of Harbour& Coastal Engineering (Indian Scenario): Vol.II of C.T.BETGERI, Deputy Director Central Institute of Coastal Engineering for Fisheries, Bangalore India.

530 m wharf is required in the harbour. In the first phase a wharf length of 220m is proposed

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COST BENEFIT ANALYSIS

Construction of Ajanur Fishing Harbour						
Cost Benefit Analysis						
The fish landings and toll revenue should be accounted for the original investment of constructing the harbour. But special investment is required to make the harbour operational throughout the year and this will gain 30 additional fishing days for the harbour. The amount for this comes to 30x500000 = 150 Lakhs per year. As the original cost is also taken for cost benefit analysis, a total of 300 fishing days is taken for the benefit calculations						
PROJECT COST						
Year	**Expansion of Ajanur Fishing Harbour**	**Quantity**	**Unit**	**Rate /Unit in Lakh Rs**	**Cost in Lakh Rs.**	**PV**
0	First Year amount				8000.00	8000
1	Balance works year 2				8000.00	7273
2	Balance works year 3				4000.00	3306
3						
4						
5	Replenishment / Maintenance of harbour @ 2.0% of construction cost / 5 yrs				400.00	248
6						
7						
8						
9						
10	Replenishment / Maintenance of harbour @ 2.0% of construction cost / 5 yrs				400.00	154
11						
12						
13						
14						
15	Replenishment / Maintenance of harbour @ 2.0% of construction cost / 5 yrs				400.00	96
	Total				**21200.00**	**19076.86**

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PROJECT BENEFITS						
Year	**Expansion of Muthalapozhy Fishing Harbour**	**Quantity**	**Unit**	**Rate /Unit Lakh Rs**	**Cost in Lakh Rs.**	**PV**
1	Nil					
2	Nil					
3	Fuel savings, 633 boats, (5Lx300daysxRs.120/L)	633	Nos	1.8	1139.40	856
3	Savings on Road transportation of fishermen and gears, 633 boats, van charges Rs1500/day x 300days	633	Nos	4.5	2848.50	2140
3	Time value saving on catch	633	Nos	0.5	316.50	238
3	Additional Fish Landings	30	Days	5	150.00	113
3	Toll/user charges	30	Days	0.333	9.99	8
4	Savings on fuel, transportation, time, fish landings and toll added together for 4th year				4464.39	3049
5	=Do=				4464.39	2772
6	=Do=				4464.39	2520
7	=Do=				4464.39	2291
8	=Do=				4464.39	2083
9	=Do=				4464.39	1893
10	=Do=				4464.39	1721
11	=Do=				4464.39	1565
12	=Do=				4464.39	1422
13	=Do=				4464.39	1293
14	=Do=				4464.39	1176
15	=Do=				4464.39	1069
	Total				**58037.07**	**26208**
					NPV=	7132
					B/C=	**1.37**

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BORE HOLE DETAILS

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BORE LOG

PROJECT : General investigation work for the proposed Ajanur Fishery Harbour
LOCATION : Kanhangad Harbour
CLIENT : Executive Engineer, Harbour Engineering Division, Kasargod

BORE HOLE NO :6
TYPE OF BORING : Rotary Drilling
DATE OF START : 28/12/2022
DATE OF FINISH : 29/12/2022

WATER TABLE LEVEL (From GL): 1.70 m
RL :
TERMINATION DEPTH : 25.75 m

SAMPLES
SPT : 14
DS : 13

Depth (m)	Soil Profile	Description of the soil	Thickness of Layers (m)	Standard penetration test data: Depth (m)	15	30	45	N	Graphical representation of 'N' value	Remarks
0		Ordinary Sand Soil	0.4	0.00					0 15 30 45 60	
0.4		Sand	10	1.50	5	8	13	21		
				3.00	13	14	14	28		
				4.50	15	28	22	>50		Balance- 2 cm
				6.00	18	31	19	>50		Balance- 4 cm
				7.50	25	>50	-	>50		Balance- 17 cm
				9.00	10	13	18	31		
10.4		Clay	7.5	10.50	1	1	1	2		
				12.00	1	1	2	3		
				13.50	1	1	1	2		
				15.00	1	2	1	3		
17.9		Stiff Clay	5.7	18.00	12	14	18	32		
				21.00	12	19	27	46		
23.6		Silty Weathered	2.15	24.00	18	31	19	>50		Balance- 5 cm
25.75				SPT Rebounded at 25.75m						No Sample

Bore Hole terminated at 25.75 m

Asst.Engineer

Asst. Exe. Engineer

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MODEL STUDY REPORT

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जल शक्ति मंत्रालय / Ministry of Jal Shakti
जल संसाधन, नदी विकास और गंगा संरक्षण विभाग
Department of Water Resources, River Development and Ganga Rejuvenation
केन्द्रीय जल और विद्युत अनुसंधान शाला
खडकवासला, पुणे – 411 024
CENTRAL WATER & POWER RESEARCH STATION
Khadakwasla, Pune – 411024

MATHEMATICAL MODELLING FOR COASTAL ENGINEERING DIVISION (Coastal and Offshore Engineering Laboratory)

TECHNICAL REPORT No.: 6283
July 2024

मछली पकड़ने के बंदरगाह के निर्माण के कारण जल-गत्यात्मकता और गाद का आकलन करने के लिए गणितीय प्रतिमान अध्ययन अजनूर, केरल

MATHEMATICAL MODEL STUDIES TO ASSESS HYDRODYNAMICS AND SILTATION DUE TO CONSTRUCTION OF FISHING HARBOUR AT AJANUR, KERALA

Dr. R. S. Kankara
Director

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REPORT DOCUMENTATION SHEET

Technical Report No. 6283 **Date: July 2024**

Title: MATHEMATICAL MODEL STUDIES TO ASSESS HYDRODYNAMICS AND SILTATION DUE TO CONSTRUCTION OF FISHING HARBOUR AT AJANUR, KERALA

Officers Responsible for Conducting the Studies

The studies were conducted by Boora Krishna, Scientist 'B', Dr. Naren Scientist 'B' and Naval Jagatap, Scientist 'B' under the supervision of Dr. Jiweshwar Sinha, Scientist 'E' and Dr. Prabhat Chandra, Additional Director and overall supervision of Dr. R. S. Kankara, Director, CWPRS, Pune.

Name and Address of Organization Conducting the Studies

Mathematical Modelling for Coastal Engineering Division
Central Water and Power Research Station, Pune - 411 024

Name and Address of Authority Sponsoring the Studies

Chief Engineer,
Harbour Engineering Department (HED),
Kamaleshwaram, Manacaud - P.O, Thiruvanathapuram – 695 009

Synopsis

Mathematical model studies to assess hydrodynamics and sedimentation aspects for the proposed development of fishing harbour at Ajanur was referred to CWPRS by Chief Engineer, HED, Kerala. The model simulations for hydrodynamics and sedimentation were carried out for the existing and the proposed condition.

As per the wave and littoral drift simulation results the proposed layout having 1150m long north breakwater, 425m long south breakwater, 435m breakwater as a river training work was studied for hydrodynamics and siltation point of view. Further, dredging upto -2m in the approach channel of the Chittari river mouth with appropriate dredging along the river was incorporated in the model. Also, dredging upto -4m in the harbour basin was considered in the hydrodynamic model simulations. The model results revealed that the annual sedimentation i.e. depth of deposition for the proposed condition in the harbour basin would be about 0.03m per year whereas depth of deposition at the river mouth would be about 0.045m in a year. A reduction in current speed due to the proposed development in the channel i.e. dredging of the channel up to -2m as well as in the proposed harbour basin would cause the loss of depth in the site. Further, an annual sedimentation of about 0.05m along the north and south of the breakwaters is also observed from the model results. Based on the model results, the proposed layout of the training works and the harbour basin is found to be suitable with the prevailing conditions at the site.

Key Words: Mathematical Model, Breakwater, Current, Sedimentation, MIKE 21

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Fig.28 Sedimentation pattern during Monsoon season (Proposed)

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Table.1 Details of suspended sediments concentration at P1 and P2

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MATHEMATICAL MODEL STUDIES TO ASSESS HYDRODYNAMICS AND SILTATION DUE TO CONSTRUCTION OF FISHING HARBOUR AT AJANUR, KERALA

Technical Report No.:6283 **DATE: July 2024**

1.0 INTRODUCTION

Harbour Engineering Department (HED), Government of Kerala proposed to develop a fishing harbour at Ajanur situated about 15km south of Kasaragod district. Ajanur fishing harbour is located geographically at Latitude 12.33^0 N and Longitude 75.18^0 E in Kerala state on the western coast of India. Fig. 1 shows the location map of Ajanur fishing harbour.

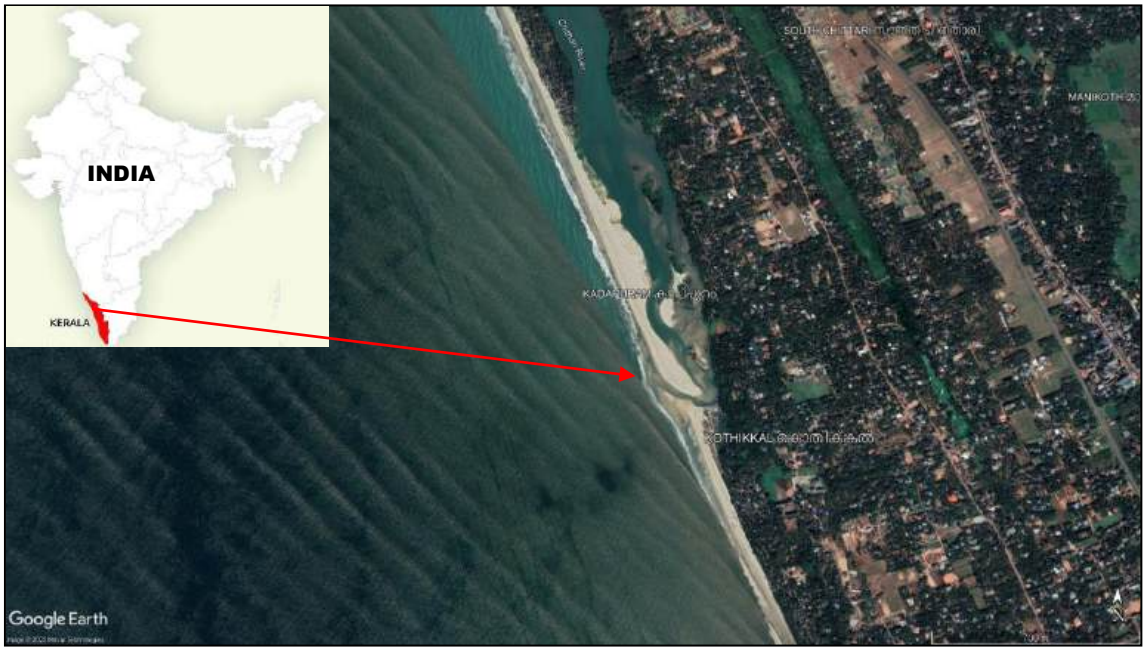


Figure 1: Location of Site at Ajanur

CWPRS carried out wave model studies on the same study area in the year 2016. These studies proposed one final layout of fishing harbour. As per the CWPRS 2016 report vide T. R. No. 5436, Nov 2016, the harbour basin area is about 19 hectares. Considering the future expansion as suggested by the Technical Sanction Committee of Pradhan Mantri Matsya Sampada Yojana (PMMSY) scheme vide HED Letter No. D4/9509/06/CE dated 16-06-2022, HED proposed a revised layout of the Ajanur fishing harbour. The revised layout consists of 1150m long north breakwater, 425m long south breakwater and 435m breakwater as a river training work near the mouth of Chittari river. River training work is proposed in the present layout considering two major coastal processes: - (i) control of shifting and closing of Chittari River mouth due to sedimentation (ii) Southward littoral drift and littoral zone consideration (from CWPRS study T. R. No 5357 Feb 2016). The revised layout is shown in Fig. 2.

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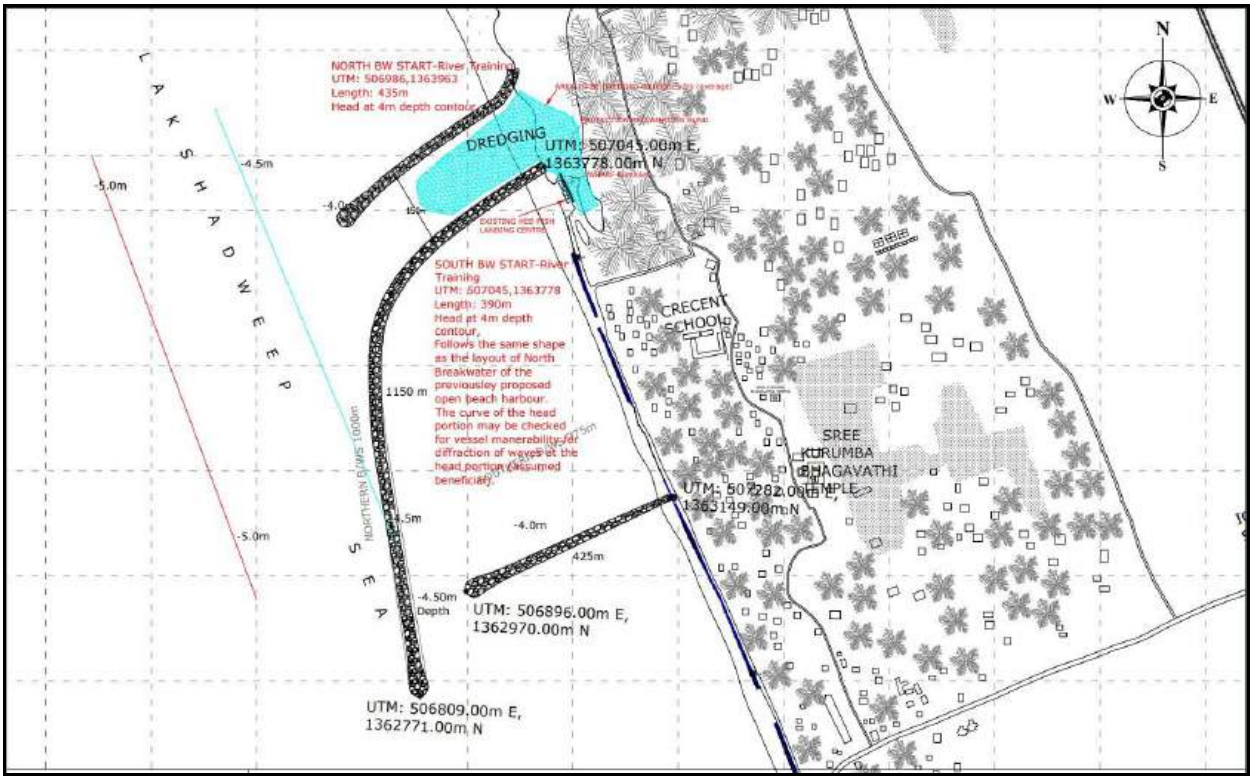


Figure 2: Proposed Layout at Ajanur

2.0 SCOPE OF STUDIES

Mathematical model studies to assess the hydrodynamics and siltation due to the proposed construction of fishing harbour are undertaken.

Following are the objectives of the present studies:

(i) To study the hydrodynamics and siltation with the existing condition.

(ii) To study the changes in hydrodynamics and siltation with the proposed condition wherein fishing harbour layout and river training work are included.

3.0 DATA ANALYSIS

The data required for the model studies are bathymetry of the area, tidal data, grain size distribution, suspended sediment concentration, river discharge, if any etc. HED, Kerala, the Project Authority (PA) has conducted field survey to collect the aforementioned data during March 2023. Earlier, PA conducted survey to collect the data in the year 2022 (1st June to 7th June). After examining the data, it was found that the data was not appropriate for numerical modelling. Hence, a re-survey for collecting the data were conducted by PA between 15th March to 20th March 2023. The data is collected both in river region (Lat:12.347, Lon 75.062) and in offshore region (Lat: 12.334 Lon: 75.0611). Henceforth, in this report these two points are called as P1 and P2 respectively as per Fig. 3. The details of the data collected are discussed below.

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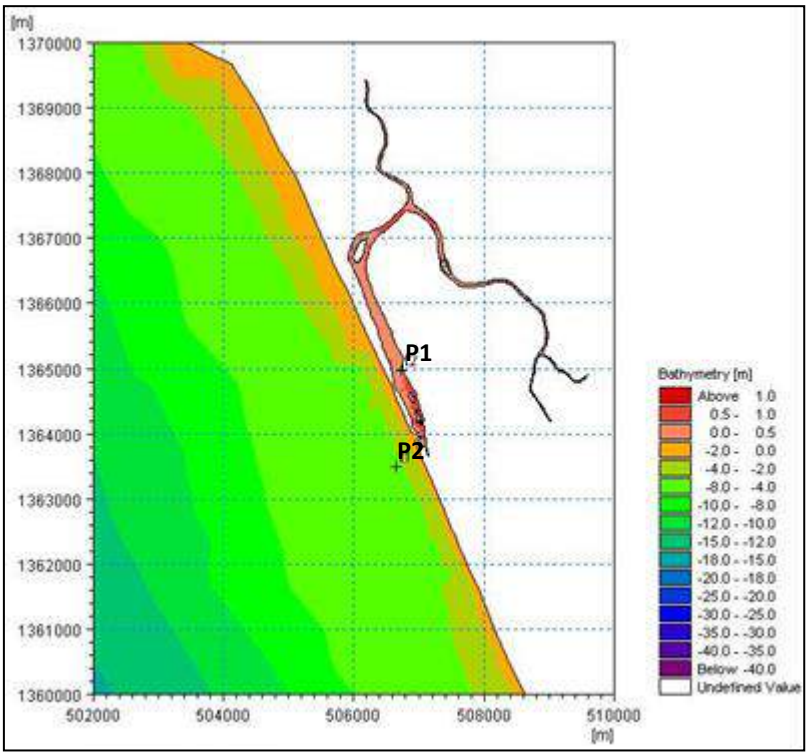


Figure 3: Field data collection points

3.1 Bathymetry

The bathymetric data for offshore shore region is obtained from C-MAP data. The nearshore bathymetry data is obtained from the hydrographic charts supplied by PA. The Acoustic Doppler Current Profiler (ADCP) of CWPRS is used to obtain the data of water level depth over the estuary and river region. The water level depth measurements are further used to estimate the bathymetry. The estimated bathymetry used in this study is shown in Fig 4.

3.2 Tides

Tidal data is collected from 15th March 2023 to 20th March 2023 at two different locations i.e., river (P1: Lat:12.347, Lon 75.062) and over sea region (P2: Lat: 12.334 Lon: 75.0611) as mentioned above. The tide data obtained at P1 and P2 w.r.t Mean Sea Level (MSL) is shown in Fig. 5. The MSL at Ajanur is 0.98m. It is observed that the spring tide tidal range (Global Tide) is about 1.30m. It is observed from the plot that tidal data at P1 is almost continuous with few missing values. However, the data at P2 is discontinuous not following usual tidal trends.

3.3 Tidal Currents

Field observed current data collected at locations P1 and P2 during March 2023 is shown in Fig 6. It is observed that the current data at both P1 and P2 shows numerous spikes at different time steps. Tide and currents data find importance in the study for calibrating the model.

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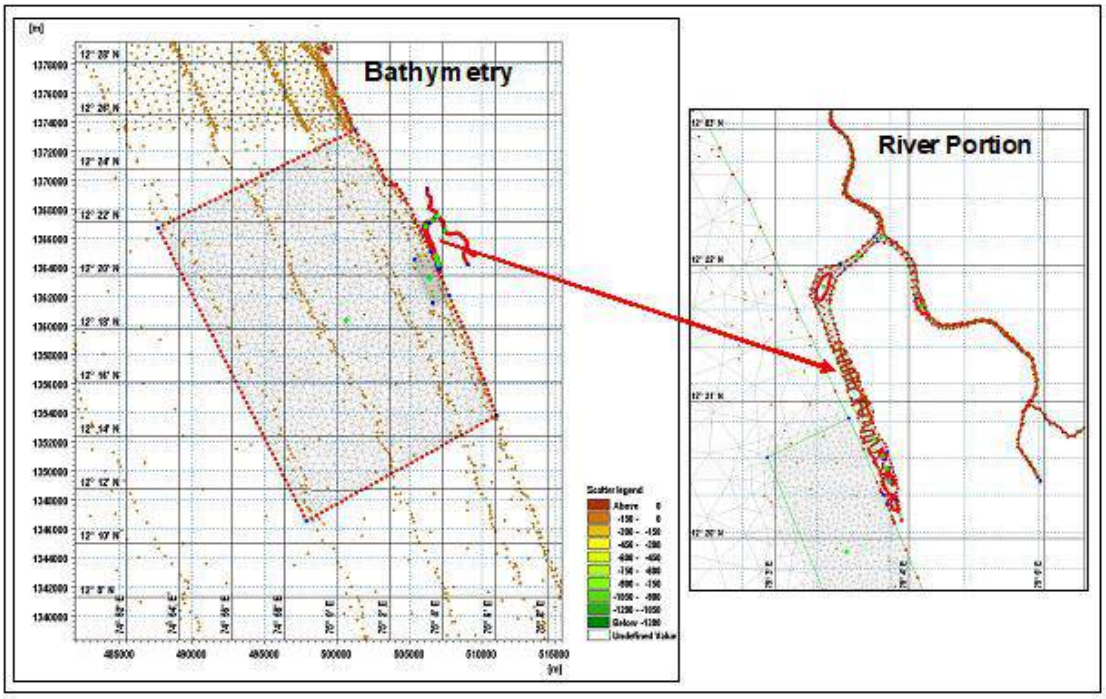


Figure 4: Bathymetry data

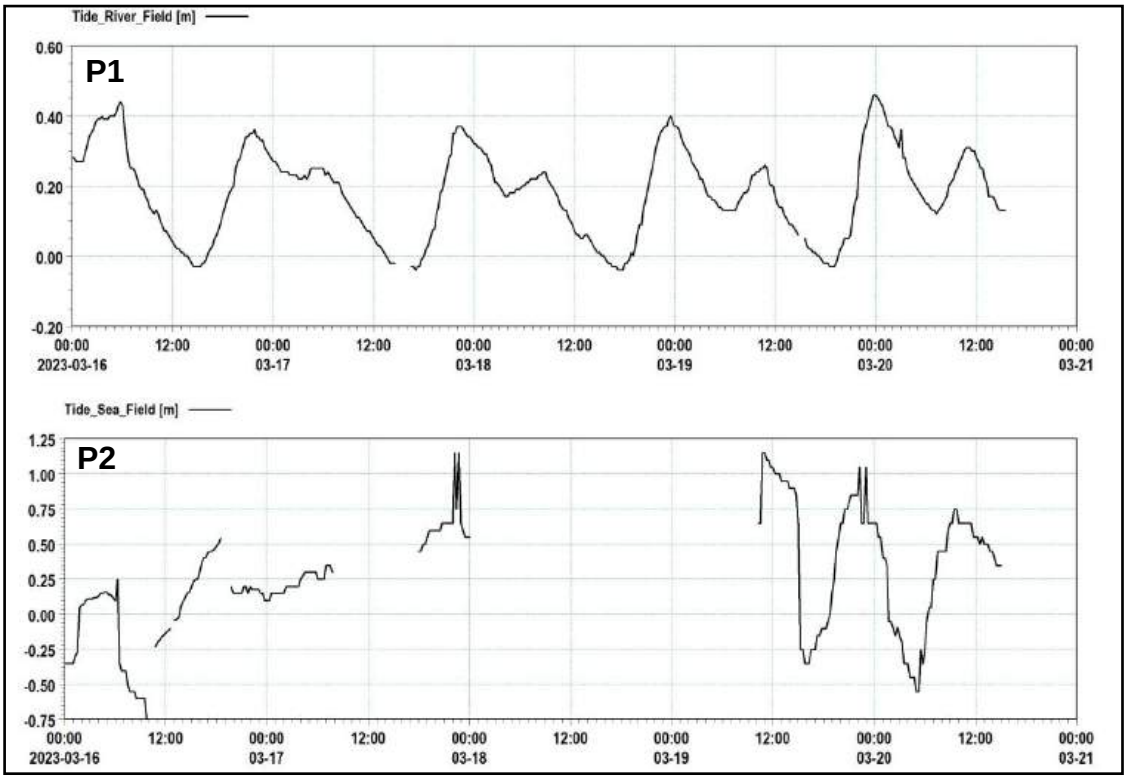


Figure 5: Observed tides at P1 and P2

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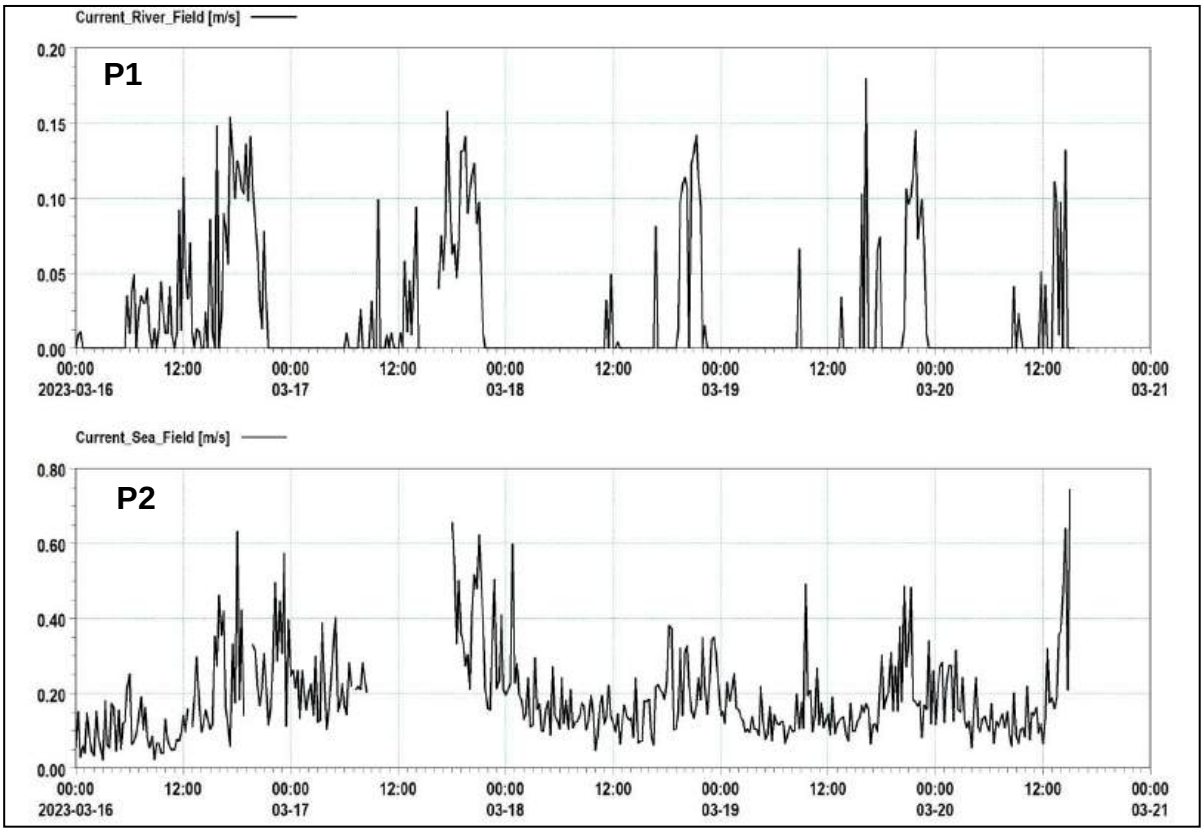


Figure 6: Observed current at P1 and P2

3.4 Sediment Data

The sediment data is collected and supplied by HED which comprised of the bed sample taken in the year 2022. The average D_{50} is 0.064mm in sea and D_{50} in river is 0.210mm.The grain size distribution at P1 and P2 is shown in Fig. 7. Water samples are collected at river and sea point (P1 and P2) during March 2023 to estimate the Suspended Sediment Concentration (SSC). From the data it is observed that SSC varies at P1 from 0.1mg/l to 0.15mg/l. Whereas, variation of SSC is between 0.05mg/l to 0.11mg/l at P2. The average suspended sediment concentration (SSC) in is 0.210mg/l and 0.08mg/l at P1 and P2 respectively. These average values of SSC are used for modelling.

3.5 Discharge Data

The river discharge is also a required parameter for calibrating the model. The river Chittari is a non-perennial river having variation in discharge during monsoon and non-monsoon seasons. As per HED, the river carries minimal discharge during monsoon and almost no discharge during the non-monsoon season. During the time period of field data collection, discharge in the river is only due to influence of tidal fluxes. The river discharge of 6 m^3/s is obtained through river ADCP observations is considered for non-monsoon season and for monsoon season, 25 m^3/s discharge is considered for modelling.

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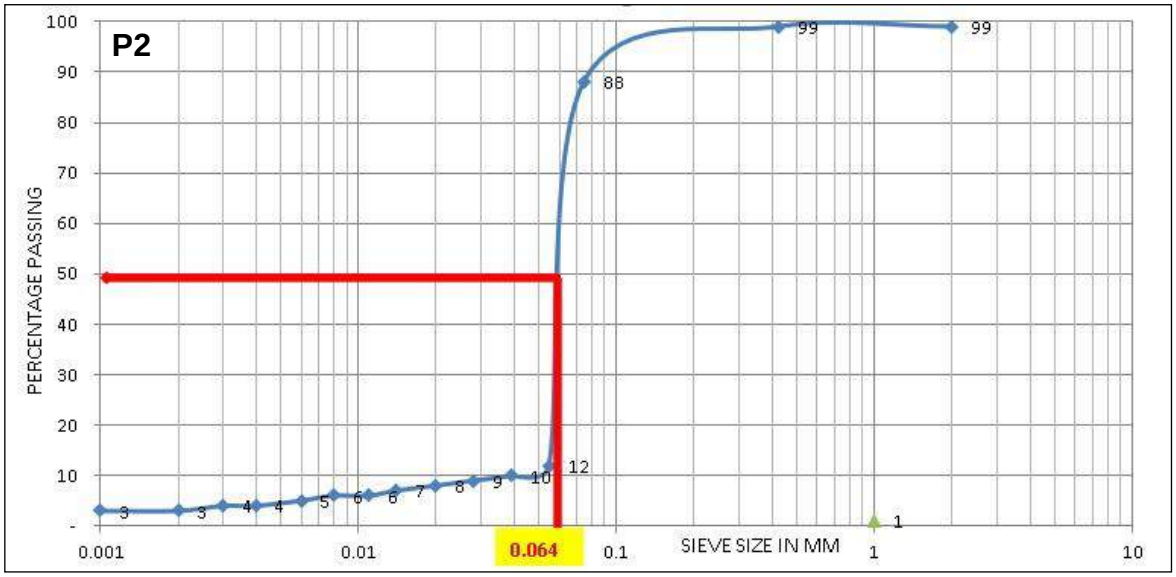


Figure 7: Grain size distribution at P1 and P2

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Table 1: Details of suspended sediments concentration at P1 and P2

P1				P2			
Sample no.	Date	Time	Suspended solids in mg/l	Sample no.	Date	Time	Suspended solids in mg/l
W1	15/03/2023	7.00pm	0.12	W1	15/03/2023	10.30am	0.07
W1	16/03/2023	8.00 am	0.13	W2	15/03/2023	7.45pm	0.06
W2	16/03/2023	2.00pm	0.1	W1	16/03/2023	3.00pm	0.07
W3	16/03/2023	8.00pm	0.11	W1	17/03/2023	8.00am	0.07
W1	17/03/2023	8.00am	0.14	W2	17/03/2023	8.15pm	0.07
W2	17/03/2023	2.00pm	0.15	W3	17/03/2023	2.00pm	0.11
W3	17/03/2023	8.00pm	0.11	W4	17/03/2023	2.30pm	0.11
W1	18/03/2023	8.00am	0.13	W5	17/03/2023	8.00pm	0.09
W2	18/03/2023	2.00pm	0.11	W1	18/03/2023	8.00am	0.06
W3	18/03/2023	7.00pm	0.13	W2	18/03/2023	1.30pm	0.08
W1	19/03/2023	8.00am	0.1	W3	18/03/2023	9.00pm	0.05
W2	19/03/2023	2.00pm	0.12	W1	19/03/2023	8.00am	0.08
W3	19/03/2023	8.00pm	0.1	W2	19/03/2023	3.00pm	0.1
W1	20/03/2023	7.00am	0.11	W1	20/03/2023	8.30am	0.09
W2	20/03/2023	2.00pm	0.1	W2	20/03/2023	1.00pm	0.07

4.0 METHODOLOGY

The mathematical model studies are carried out using MIKE 21 software using the Flexible Mesh. The flexible mesh is considered as suitable for creeks with meandering coastline. The hydrodynamic studies include simulation of the flow field for the following conditions: -

1. Calibration of the model with the existing site conditions of the year 2023.
2. In the proposed condition, the layout as shown in Fig. 2 is studied for assessment of changes in the hydrodynamics and sedimentation.

The model run to evaluate hydrodynamics would be calibrated with the observed field data along with wave induced currents (radiation stresses) from wave model studies. The calibrated model will be used to predict the changes in the flow pattern for the proposed condition. The results of the above hydrodynamic studies are used as basic input for the sediment transport studies.

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Model studies are carried out by coupling the flow models with sedimentation models to predict the evolving changes in sedimentation pattern. The results of these studies show the spatially varying pattern of siltation and erosion. The simulation of hydrodynamics and sedimentation (for existing and proposed condition) is separately performed for monsoon and non-monsoon seasons. The comprehensive detail of the hydrodynamics, wave and siltation studies for both existing and proposed condition is useful information for the coastal population and also the policy makers.

5.0 DESCRIPTION OF MODULES OF MIKE 21 FM

The 2-dimensional hydrodynamic model MIKE 21 HD, Flexible Mesh is used for simulating the flow field in the model domain and MIKE 21 MT for the sediment transport studies in the existing and the proposed scenario under prevailing tidal and wave conditions. The brief description of scientific background of MIKE 21 HD and MIKE 21 MT is given below.

5.1 MIKE-21 HD MODULE:

For any major developments in coastal areas, it is necessary to know dynamics of the water body in terms of velocity and water level fluctuations beforehand. The appropriate governing equations for studying water movement in coastal areas are the two-dimensional shallow water equations. These shallow water equations are obtained by vertically integrating the 3-Dimensional incompressible Reynold's averaged Navier- Stokes equations of motion over depth $h = \eta + d$ with the following simplified assumptions.

- The flow is incompressible,
- The flow is well mixed (no variation in density)
- Vertical accelerations are negligible,
- Bed stress can be modeled.

$$\frac{\partial h}{\partial t} + \frac{\partial h\bar{u}}{\partial x} + \frac{\partial h\bar{v}}{\partial y} = hS \qquad (1)$$

$$\frac{\partial h\bar{u}}{\partial t} + \frac{\partial h\bar{u}^2}{\partial x} + \frac{\partial h\overline{vu}}{\partial y} = f\bar{v}h - gh\frac{\partial \eta}{\partial x} - \frac{h}{\rho_0}\frac{\partial p_a}{\partial x} - \frac{gh^2}{2\rho_0}\frac{\partial \rho}{\partial x} + \frac{\tau_{sx}}{\rho_0} - \frac{\tau_{bx}}{\rho_0} -$$

$$\frac{1}{\rho_0}\left(\frac{\partial s_{xx}}{\partial x} + \frac{\partial s_{xy}}{\partial y}\right) + \frac{\partial}{\partial x}(hT_{xx}) + \frac{\partial}{\partial y}(hT_{xy}) + hu_sS \qquad (2)$$

$$\frac{\partial h\bar{v}}{\partial t} + \frac{\partial h\bar{v}^2}{\partial x} + \frac{\partial h\overline{uv}}{\partial y} = f\bar{u}h - gh\frac{\partial \eta}{\partial y} - \frac{h}{\rho_0}\frac{\partial p_a}{\partial y} - \frac{gh^2}{2\rho_0}\frac{\partial \rho}{\partial y} + \frac{\tau_{xy}}{\rho_0} - \frac{\tau_{by}}{\rho_0} -$$
$$\frac{1}{\rho_0}\left(\frac{\partial s_{yx}}{\partial x} + \frac{\partial s_{yy}}{\partial y}\right) + \frac{\partial}{\partial x}(hT_{xy}) + \frac{\partial}{\partial y}(hT_{yy}) + hv_sS \qquad (3)$$

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The over bar indicates a depth average value for example, $\bar{u}$ and $\bar{v}$ are the depth-averaged velocities defined by

$$h\bar{u} = \int_{-d}^{n} u dz\,, \qquad h\bar{v} = \int_{-d}^{n} v dz$$

The lateral stresses T_{ij} include viscous friction, turbulent friction and differential advection. They are estimated using an eddy viscosity formulation based on the depth average velocity gradients.

$$T_{xx} = 2A\frac{\partial \bar{u}}{\partial x} \qquad T_{xy} = A\left(\frac{\partial \bar{u}}{\partial y} + \frac{\partial \bar{v}}{\partial x}\right) \qquad T_{yy} = 2A\frac{\partial \bar{v}}{\partial y}$$

The following symbols are used in the equations:

t	:	Time
x and y	:	Cartesian co-ordinates
$h = \eta + d$	:	Total water depth
d	:	Still water depth
S_{xx}, S_{xy}, S_{yy}	:	Components of radiation stresses
$\tau_{xx}, \tau_{xy}, \tau_{yy}$	:	Shear stress components
ρ	:	Density of water
$\bar{u}\bar{v}$	:	Depth averaged velocities
η	:	Surface Elevation
g	:	acceleration due to gravity (m/s^2)
f	:	wind friction factor related to Coriolis parameter
p_a	:	Atmospheric pressure
ρ_0	:	Density of water
S	:	Magnitude of discharge due to point sources
u_s, v_s	:	velocities at point sources
$f = 2\Omega sin\Phi$	:	Coriolis parameter (Ω is the angular rate of revolution and φ the geographic Latitude)
A	:	Horizontal eddy viscosity

The governing equations are solved by using an element-centered finite volume method. The spatial domain is discretised into non-overlapping elements, which can be either triangular or quadrilateral. The time integration can be done by using first order explicit Euler method (referred to as the lower temporal order scheme) or by using second order Runge Kutta method (referred to as the higher temporal order scheme).

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5.2 MIKE-21 MT MODULE

The sediment transport studies were carried out using MIKE 21 MT model. This model simultaneously solves hydrodynamic and sediment transport equations. The calibration of sediment transport model is difficult because morphological changes are too slow and temporal bed changes are too variable to measure anything significant for comparison. The sediment fluxes at various locations may differ and the following factors contribute for these variations:

- Unsteadiness of flow,
- Mixtures of sediment in suspension,
- Variability of supply of mobile sediment on the bed,
- Presence of sandy (non-cohesive) sediment,
- Omission of depth variation,
- Effect of wave stirring.

The erosion, transport and deposition of silt, mud and clay particles under action of currents and waves can be best described by the multi-layers mode of the mud transport module of MIKE 21. The sediment transport module is dynamically coupled with the 2-dimensional hydrodynamic module, MIKE 21 HD. The module solves the primitive equations in two dimensions using finite difference methods by Alternating Direction Implicit technique and the Double Sweep algorithm. Following are the relationships used in the module.

The sediment transport formulations are built into the advection-dispersion module, MIKE 21 AD, which solves advection-dispersion equation:

$$\frac{\partial c}{\partial t}+u\frac{\partial c}{\partial x}+v\frac{\partial c}{\partial y}=\frac{1}{h}\frac{\partial}{\partial x}\left(hD_x\frac{\partial c}{\partial x}\right)+\frac{1}{h}\frac{\partial}{\partial y}\left(hD_y\frac{\partial c}{\partial y}\right)+Q_L C_L\frac{1}{h}-S \qquad (4)$$

The following symbols are used in the equation:

c	:	compound concentration (arbitrary units)
u,v	:	horizontal velocity components in x, y directions (m/s)
h	:	water depth (m)
Dx,Dy	:	dispersion coefficients in the x,y directions (m2/s)
S	:	accretion/erosion term (kg/m3/s)
QL	:	source discharge per unit horizontal area (m2/s/m2)
CL	:	concentration of source discharge (kg/m3)

The advection-dispersion equation is solved using an explicit, third-order finite difference scheme, and known as the ULTIMATE scheme.

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6.0 MODEL STUDIES

The MIKE 21 HD module is used to study the hydrodynamics. For studying the sedimentation, MIKE 21 MT module is used. These modules are used for the existing and proposed layouts. The details of MIKE 21 HD and MIKE 21 MT modules used in this study are discussed below.

6.1 Computational Model

The spatial extent of computational model considered for model simulations is 16km (cross-shore) X 22km (along the shore). The computation model with its offshore and onshore boundaries is shown in Fig. 8. The Chittari river discharging into the ocean is considered to a certain extent in the computation model as shown in Fig. 8.

All oceanographic features of the study region in existing condition are incorporated in the computational model. The complete study area was discretised into computational unstructured mesh. The spatial resolution of the mesh is finer along the area of development (harbour area). Finer mesh resolution is adopted near harbour area in order to capture the variation in near shore tide and currents more accurately. The mesh resolution is coarser along the offshore boundary. The developed mesh showing the fine and coarser resolution in the computational model is shown in Fig. 9.

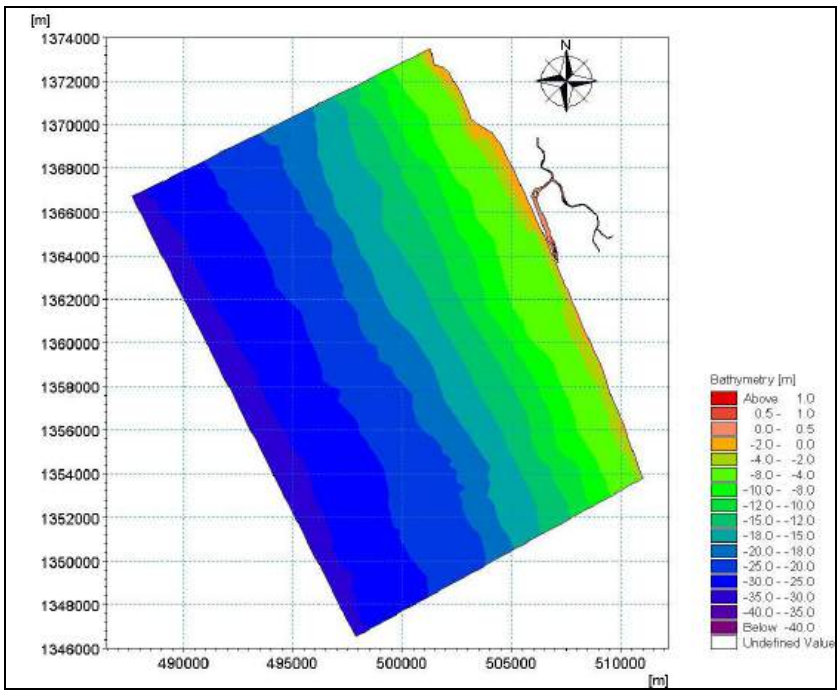


Figure 8: Computational model

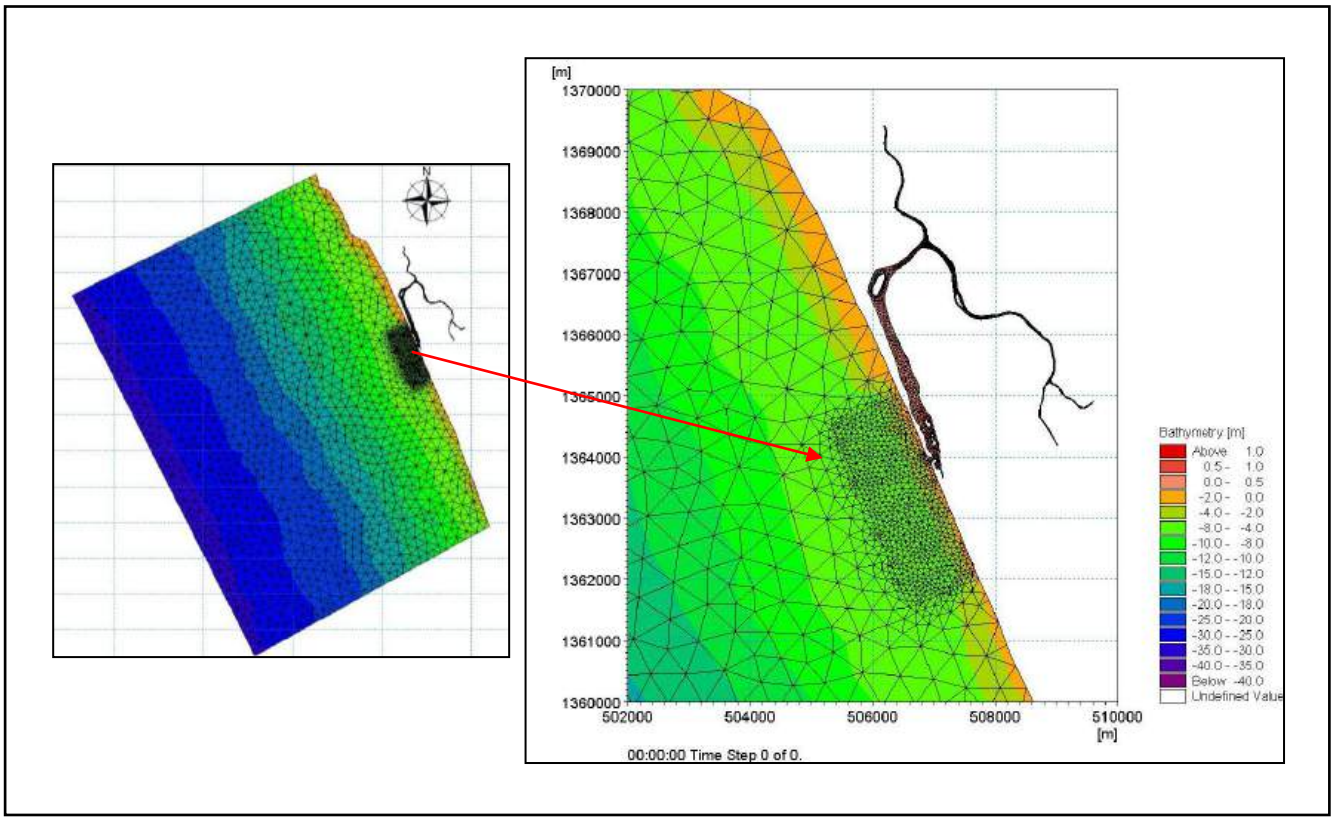


Figure 9: Computational mesh showing variable mesh resolution

6.2 Simulation of Flow Field – Existing condition- non-monsoon and monsoon seasons

Initially, flow field are modelled for the existing conditions for both non-monsoon and monsoon seasons. Defining boundary condition is essential for modelling the flow field. There are three offshore boundaries and one land boundary. The boundary tides are defined along these three offshore boundaries. The boundary tides obtained from MIKE 21 Global tidal model is used to define the boundary condition with phase lag. Further, discharge along the Chittari river is also given as another boundary condition. As the flow is assumed to be parallel to the contours along the western boundary, no-cross flux was considered in the west boundary in the open sea. Radiation stresses are also considered in the simulation to take into account the effect of wave induced currents. With these given forcings, MIKE 21 HD module is used to model the variation in tides and currents for a period of 15 days in non-monsoon (March 2023) and monsoon (July 2023) separately. The changes in flow fields are estimated every 30 minutes. Typical velocity vector plots during different phase of tides obtained during non-monsoon and monsoon seasons are shown from Fig. 10 to Fig. 13.

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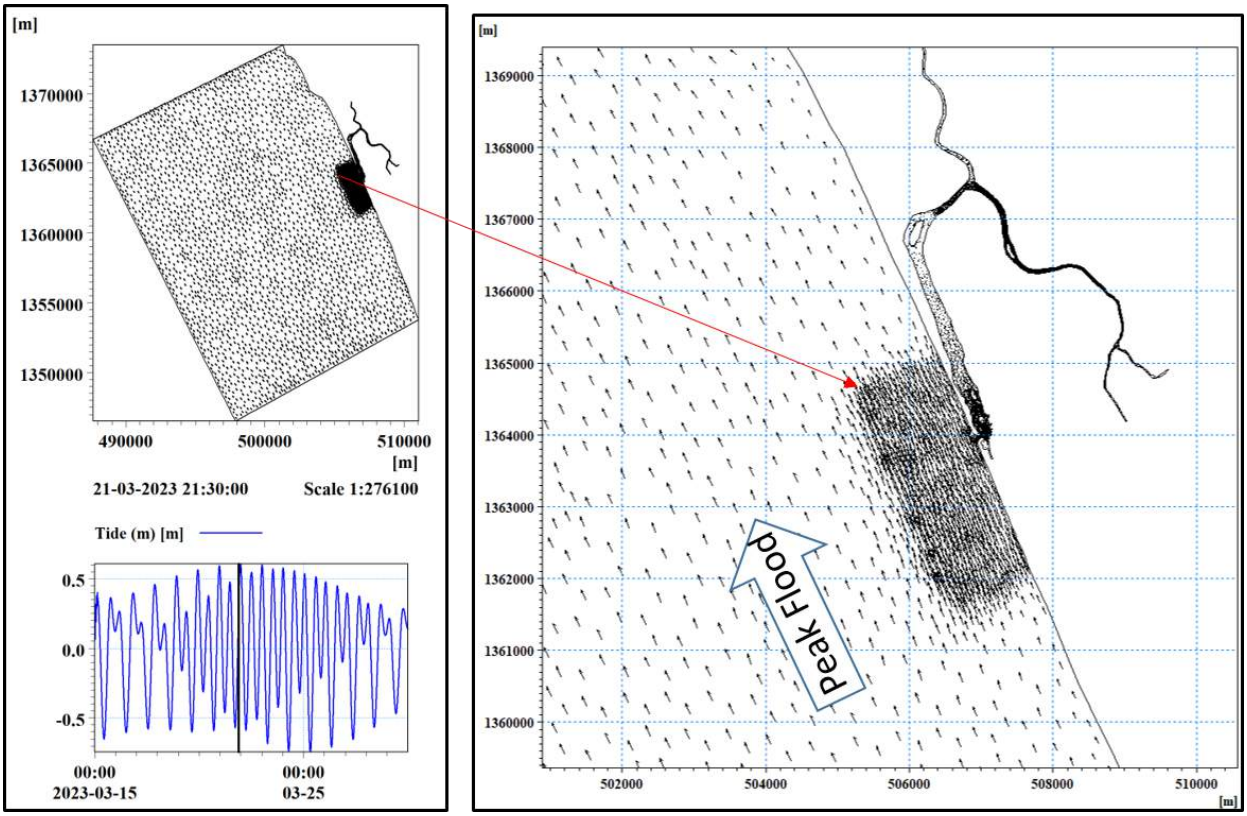


Figure 10: Flow field during peak flood-Non-monsoon season (Existing)

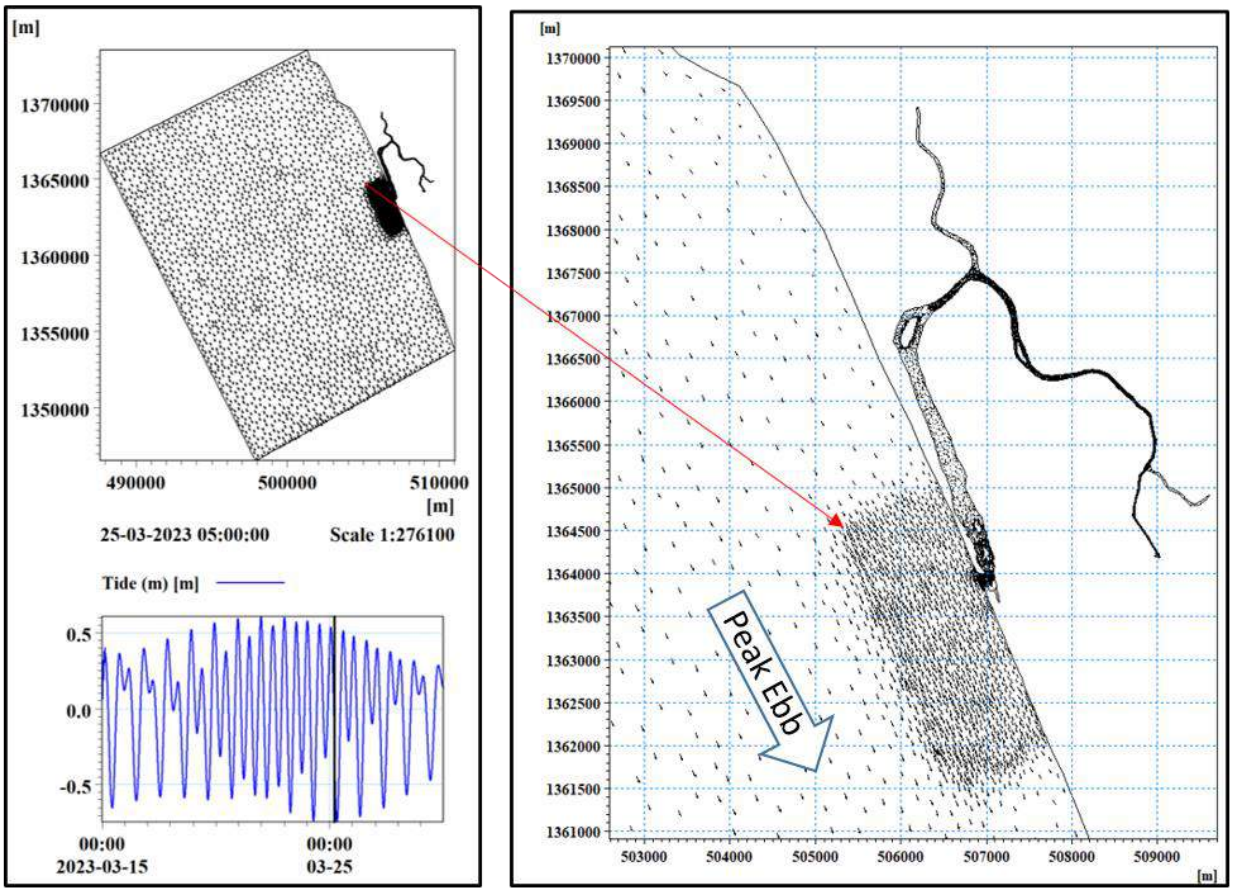


Figure 11: Flow field during peak ebb -Non-monsoon season (Existing)

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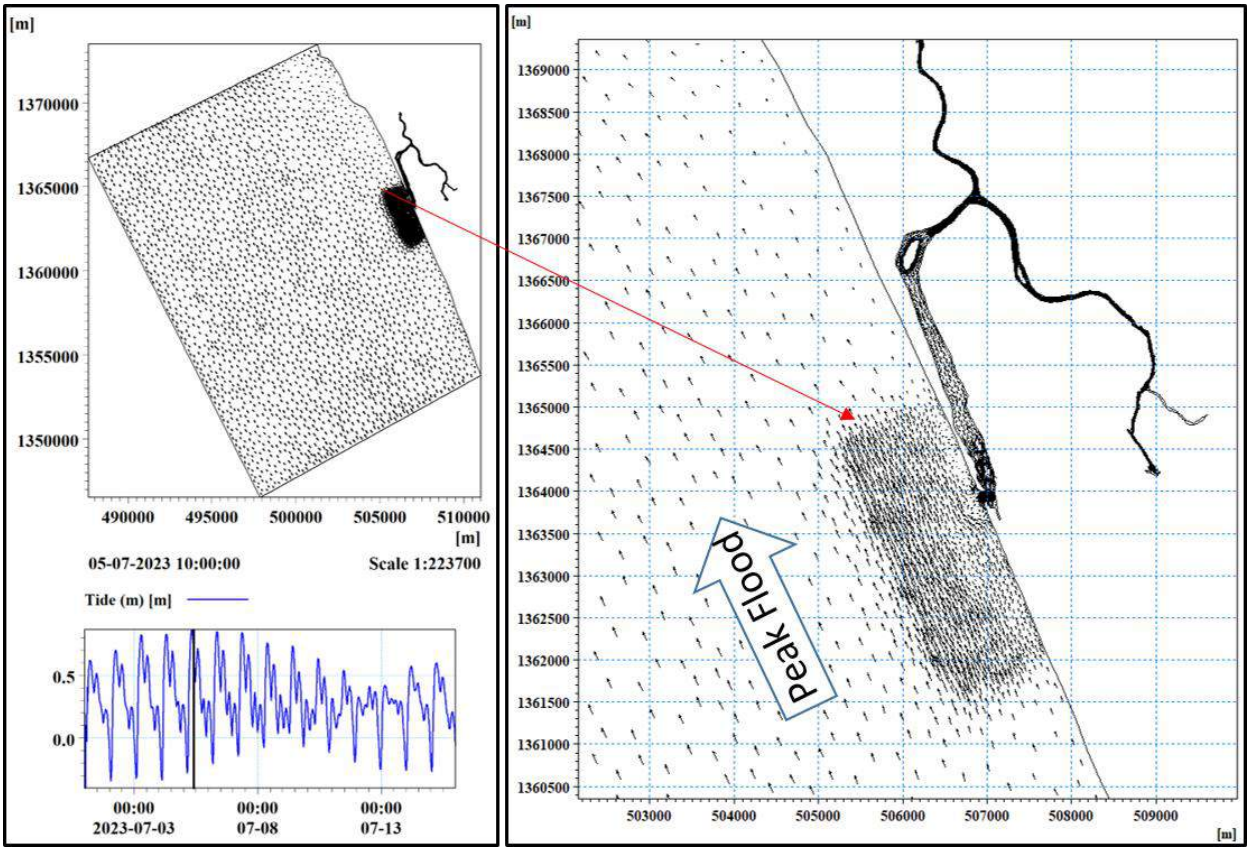


Figure 12: Flow field during peak flood- Monsoon season (Existing)

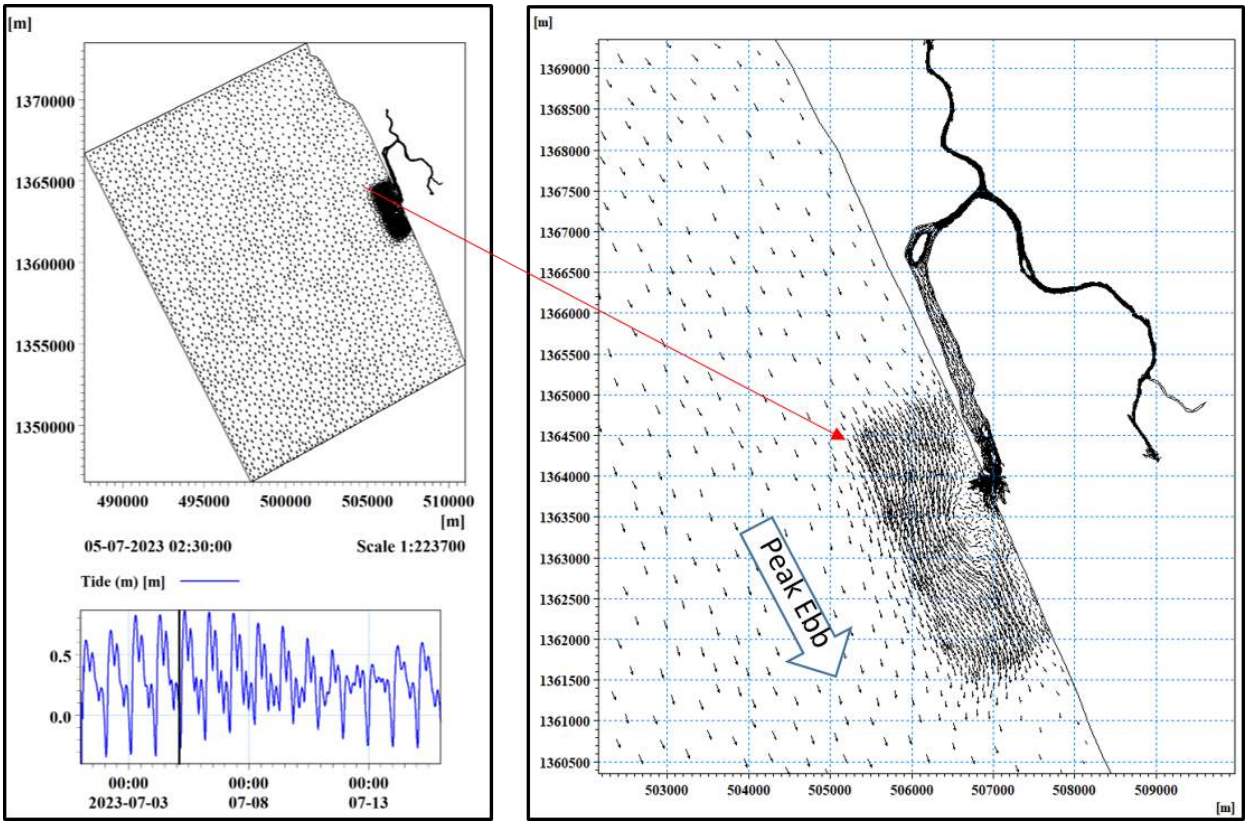


Figure 13: Flow field during peak ebb- Monsoon season (Existing)

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The length of the vector gives magnitude of the current while the arrowhead shows the direction of flow. During peak flood, flow follows natural contour parallel to the coastal. The observed data of tides and current are provided at two points (P1 and P2) in the study area by the HED. Point P1 and Point P2 is located along the river and sea side of the computational domain respectively. The details of geographical location of P1 and P2 is discussed above in section 3. These two points are used for the purpose of comparison of modelled tides and currents against the observed values. The observed data of tides and currents at P1 and P2 are obtained during non-monsoon season only. The comparison of computed tides against the field values during non-monsoon season is shown in Fig. 14.

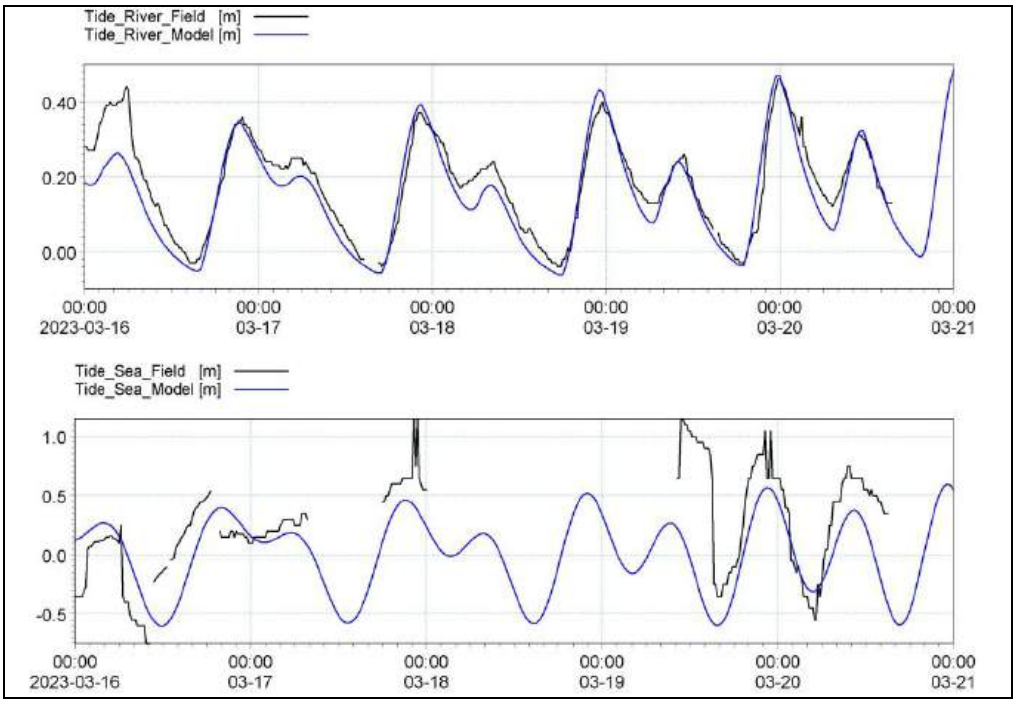


Figure 14: Comparison of tides (Field Vs Computed)

From the Fig.14, it is observed that there is good correspondence between the computed and field values of tides at the point P1. The good correspondence at P1 signifies the efficacy of model calibration. Due to the inherent ambiguity of the field current data at P1 and P2 provided by the PA, it is not possible to compare the computed values of currents at P1 and P2 against the field data. However, modelling results of currents shows that peak values of currents are captured more accurately by the model. Hence, there is good correspondence of computed peak current with the field peak currents. The peak of field current is 0.14m/s and peak of computed current obtained is 0.17m/s at P1. Similarly, at P2 peak of field current is 0.40m/s whereas peak of obtained computed current is 0.39m/s. The littoral drift and sediment pattern studies for the existing condition is discussed below

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6.3 Littoral Drift Studies

Littoral drift studies are necessary for mapping the littoral distribution and changes in shoreline at the proposed location of fishing harbour. The littoral drift at this study area was carried out by CWPRS in the year 2016. The simulation results of the littoral studies were already reported vide Technical Report: - T.R. No. 5357 of 2016. The study reveal that annual southward and northward transports are 0.531Mm^3 and 0.118Mm^3 respectively with the net and gross transports being 0.413Mm^3 and 0.649Mm^3 respectively. Other findings of the study reveal that shoreline evolution in 10 years period will result in accretion on the northern side (68m in cross shore direction) and southern side (40m in cross-shore direction) of the proposed northern and southern breakwater respectively. This accretion and erosion is expected to extend further upto 2500m and 1500m towards along the shore towards north and south direction respectively. The shoreline evolution over the years for accretion and erosion is shown in Fig.15. Taking into consideration the influential role of silt and clay (mud) on sedimentation, in the present study, Mud Transport (MT) is modelled using MIKE 21 MT for identifying the spatially varying zones of sedimentation.

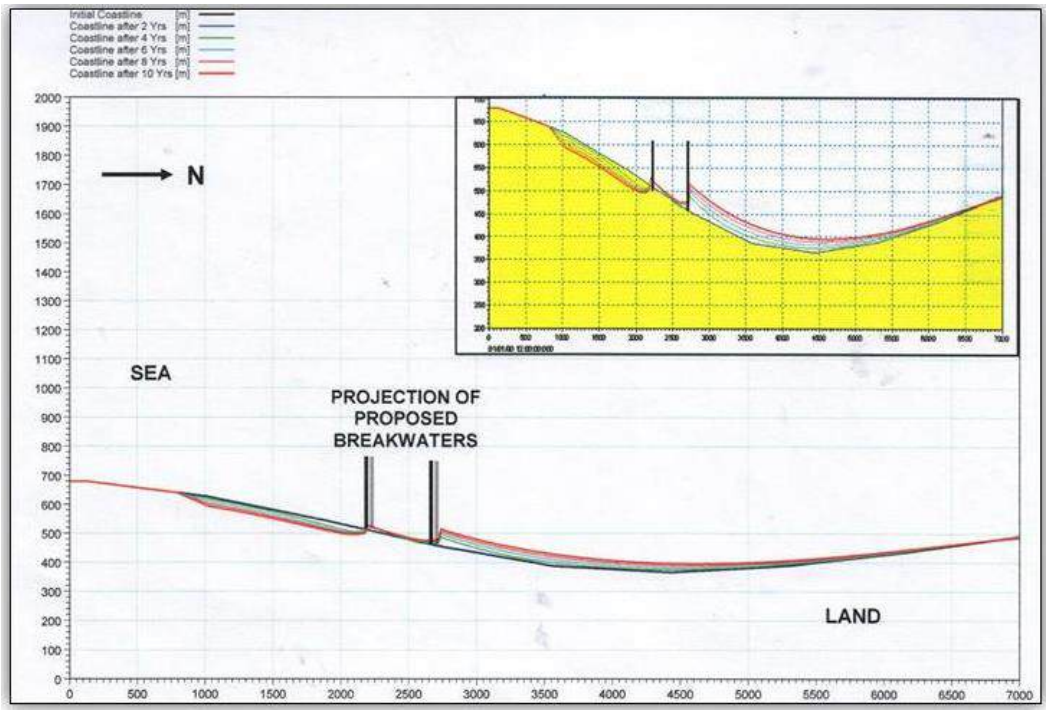


Figure 15: Shoreline evolution after 2nd,4th ,6th,8th and 10th year

6.4 Sedimentation Pattern - Existing Condition-non-monsoon and monsoon seasons

The sedimentation studies were carried out for the existing conditions for both non-monsoon and monsoon seasons using MIKE21 MT module. The results of hydrodynamic studies is one of the important inputs for sedimentation modelling using MIKE21 MT . Other inputs required are SSC and bed sample data in the study area. The data of SSC and bed sample are given by

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HED for non-monsoon season. For monsoon season 50% increased SSC fraction of non-monsoon season is assumed to be adopted as input for sedimentation modelling. Using these inputs in the MIKE 21 MT model, sedimentation studies were carried out for the existing condition for a period of one month. The sedimentation patterns during non-monsoon and monsoon seasons are shown in Fig. 16 and Fig. 17 respectively. During monsoon period with the elevated discharge of Chittari River, flushing out of sediments deposited during non-monsoon period is observed. The estimated deposition (maximum) of about 0.1m in a year over the computational domain is obtained. The annual sedimentation estimated at the river mouth is about 0.021m for the existing condition.

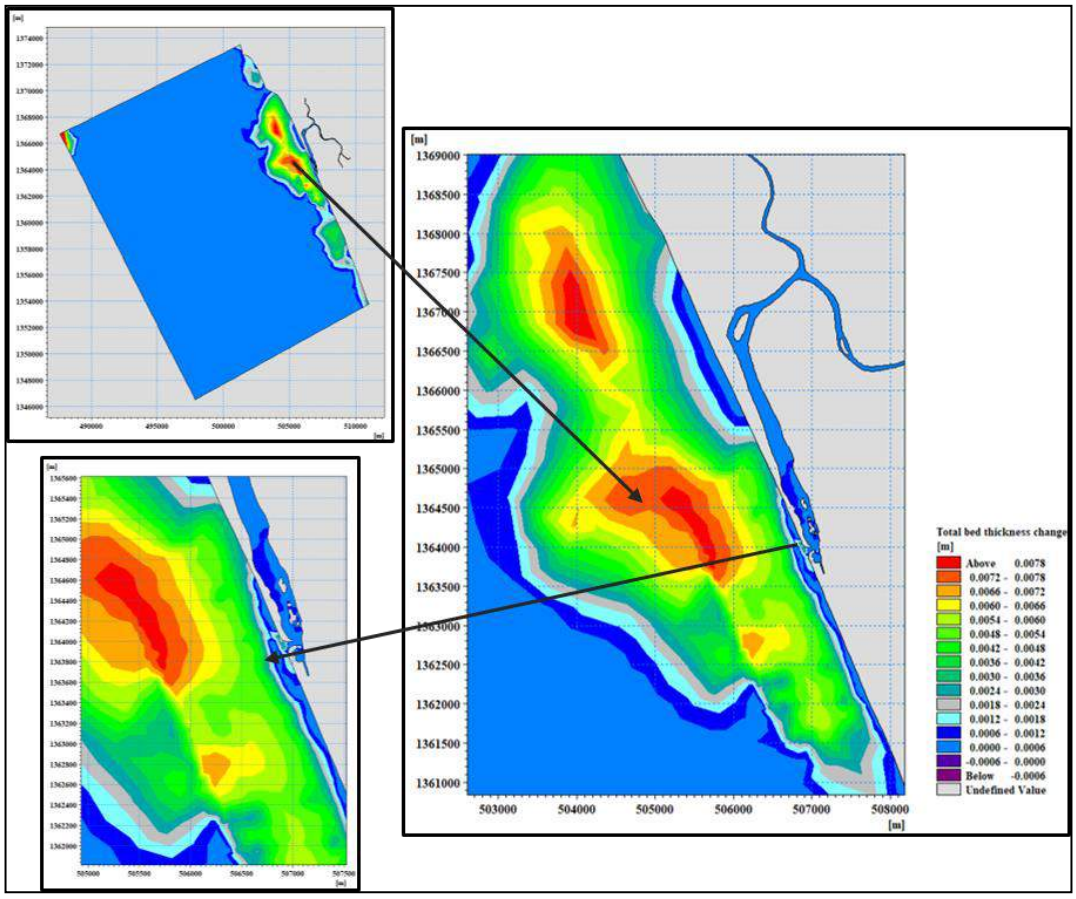


Figure 16: Sedimentation pattern during Non-monsoon season (Existing)

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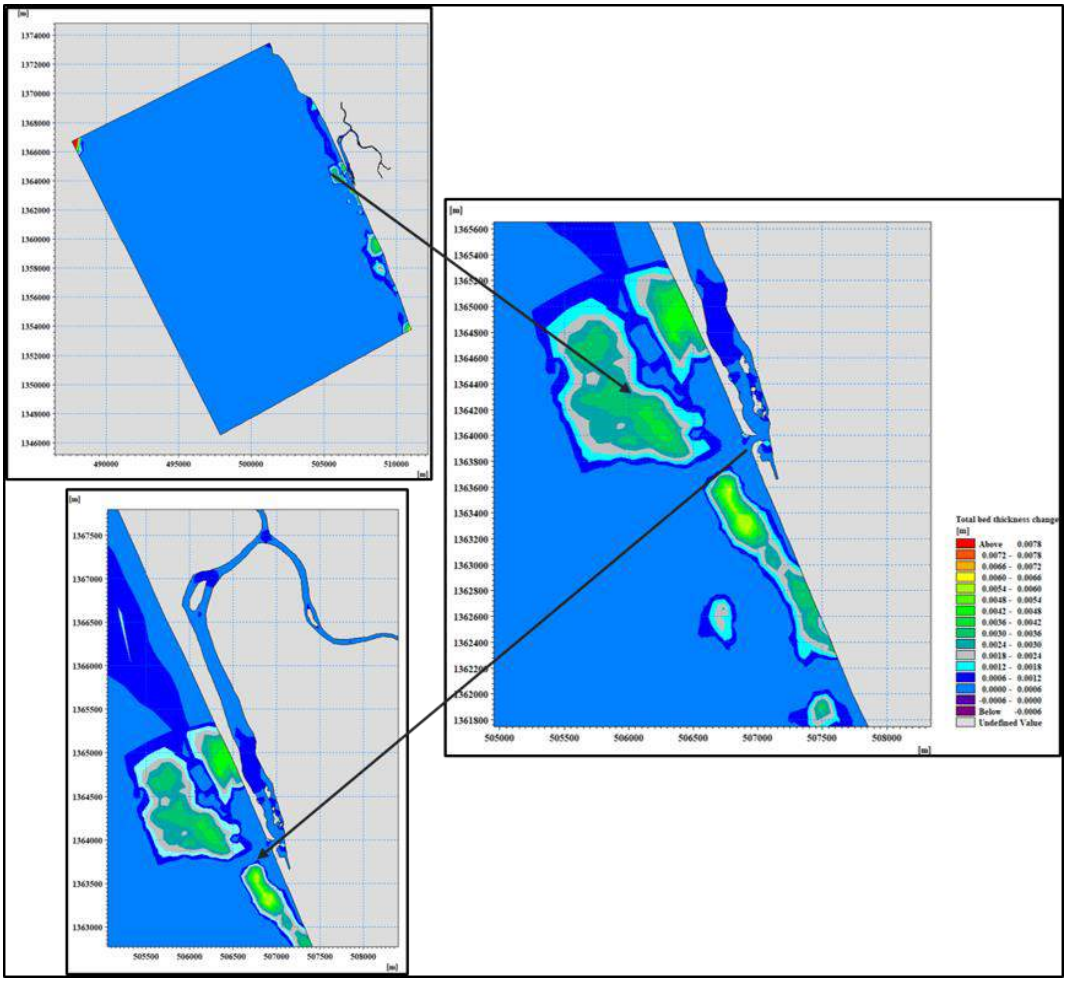


Figure 17: Sedimentation pattern during Monsoon season (Existing)

6.5 Simulation of Flow Field - Proposed Condition-non-monsoon and monsoon seasons

The calibrated model setup of existing condition was re-established by incorporating the features of the proposed layout. The layout consists of 1150m long north breakwater, 425m long south breakwater, 435m breakwater as a river training work & dredging (-2m) inside the approach channel nearer to the Chittari river mouth and suitable dredging along the river. The layout also consists of dredging of -4m inside the proposed fishing harbour. The bathymetry after re-establishing the proposed layout is shown in Fig. 18.

The computation domain with the unstructured mesh developed for the proposed layout is shown in Fig. 18. The mesh resolution considerations are the same as discussed in the section 6.1.

The flow is modelled during non-monsoon and monsoon seasons following the similar procedure and boundary condition constraints as adopted for simulating the flow conditions for the existing conditions. MIKE 21 HD module is again simulated to get the outputs of tides and currents for the proposed layout.

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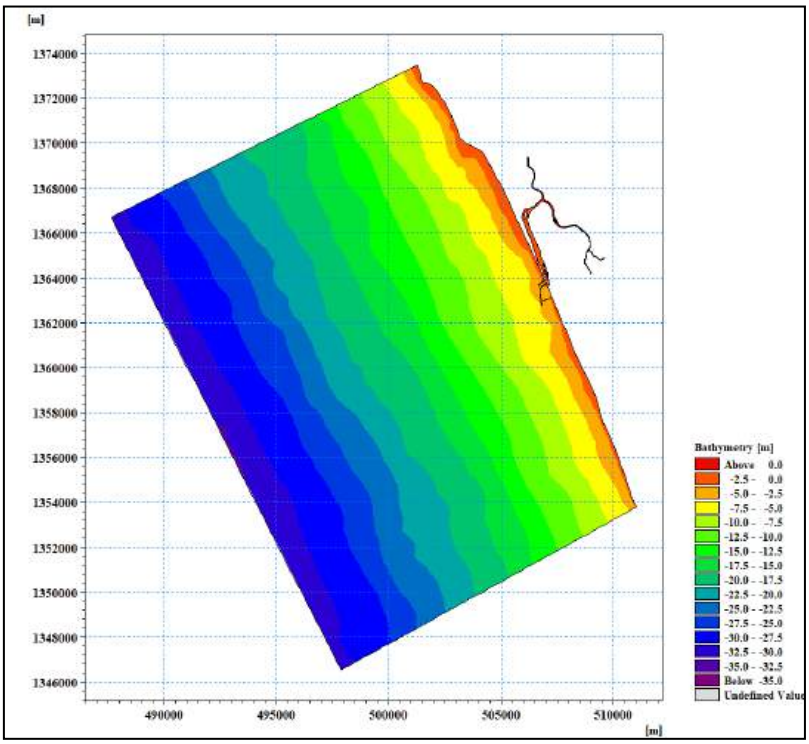


Figure 18: Bathymetry with proposed layout

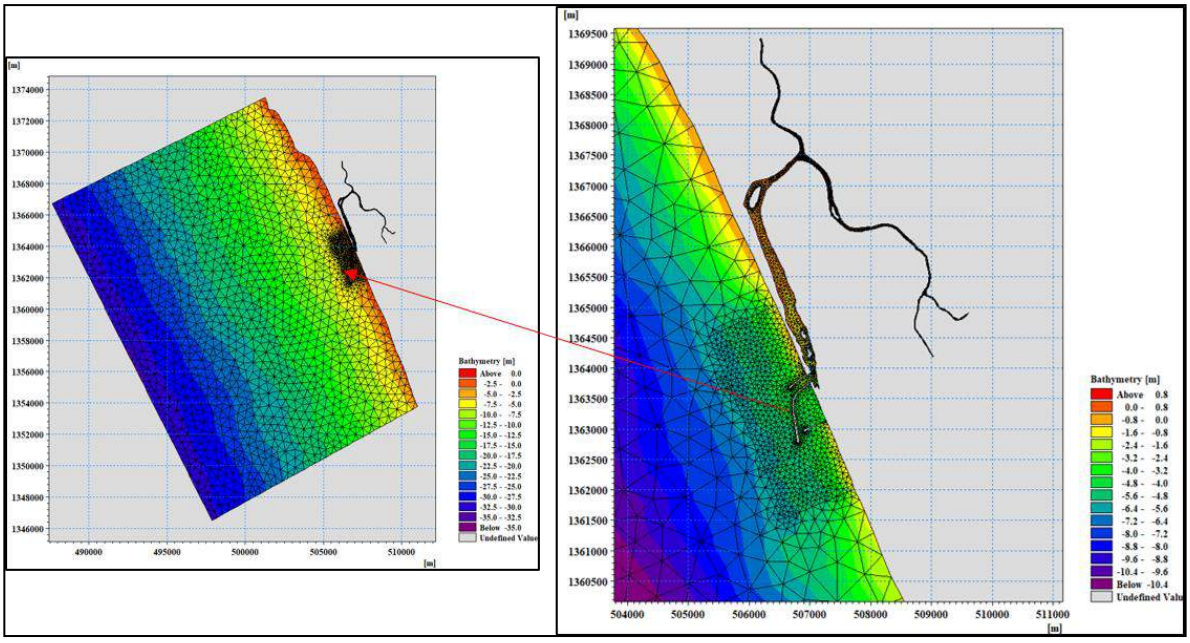


Figure 19: Computational domain for proposed layout

The flow fields along the model domain obtained for non-monsoon and monsoon seasons during peak flooding and ebbing tidal phases are shown from Fig. 20 to Fig. 23. During non-monsoon season, it is observed from the flow fields that circulation is formed near south breakwater during ebbing phase of tide. However, during monsoon season, circulation is formed near south breakwater (during flooding and ebbing phase of tide). In addition, during flooding phase, circulation is formed at 2 other locations (near north breakwater and entrance of river mouth) also. Though eddies formed around the circulation are weak, its intensity may

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change according to changes in local climate. Furthermore, four points t1, t2, t3 and t4 called as monitoring stations are considered for assessment of changes in currents after construction of proposed layout. The locations of these four monitoring stations are shown in Fig. 24.

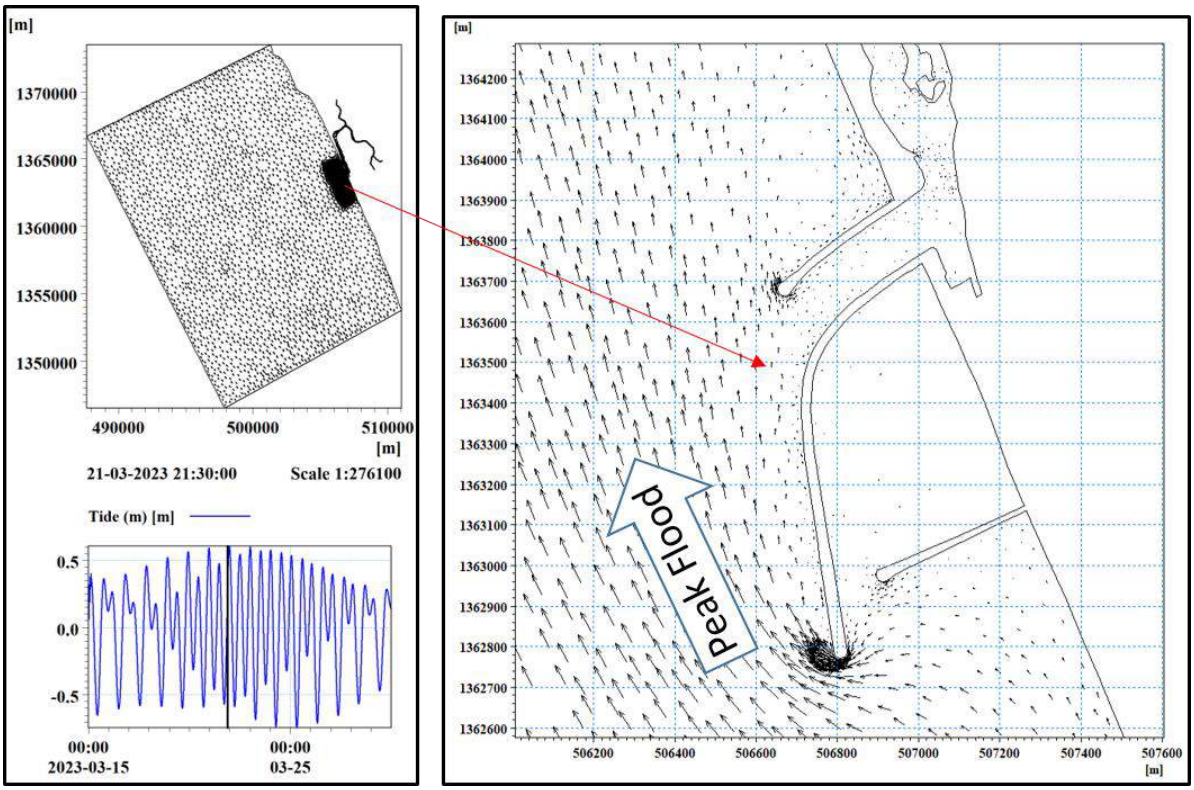


Figure 20: Flow field during peak flood-Non-monsoon season (Proposed condition)

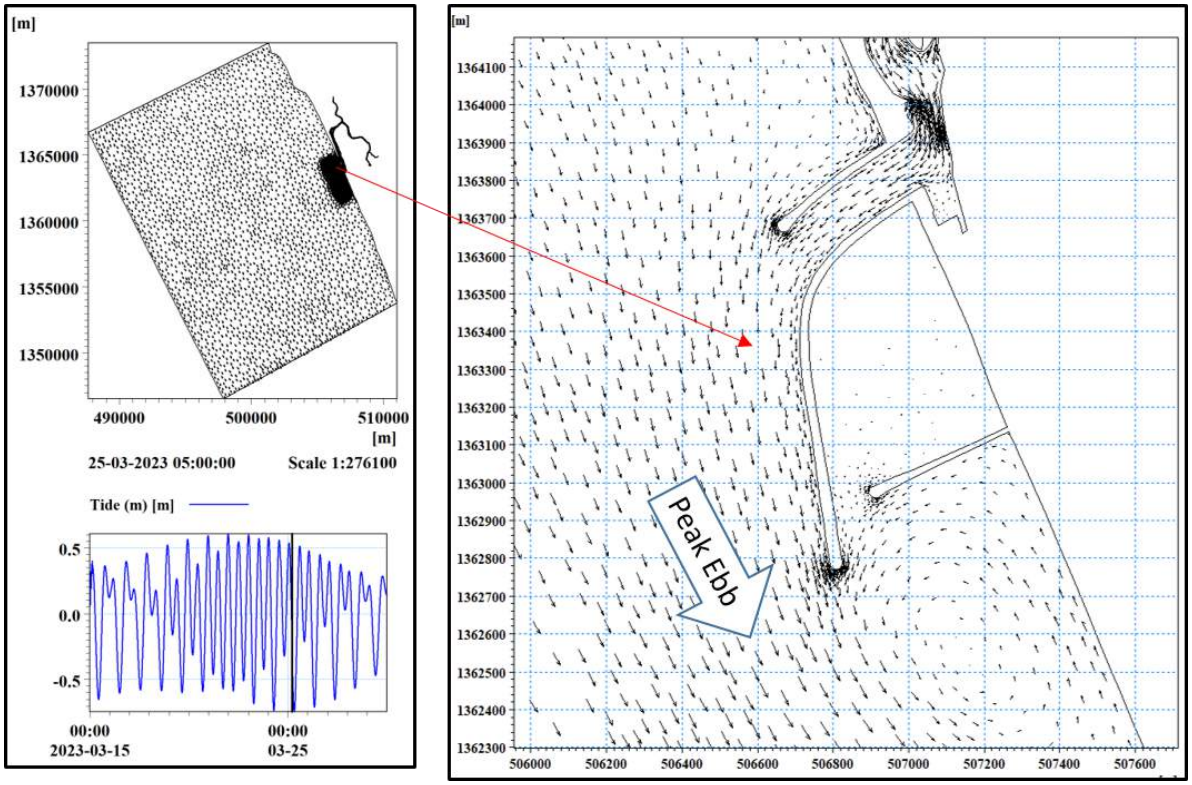


Figure 21: Flow field during peak ebb -Non-monsoon season (Proposed condition)

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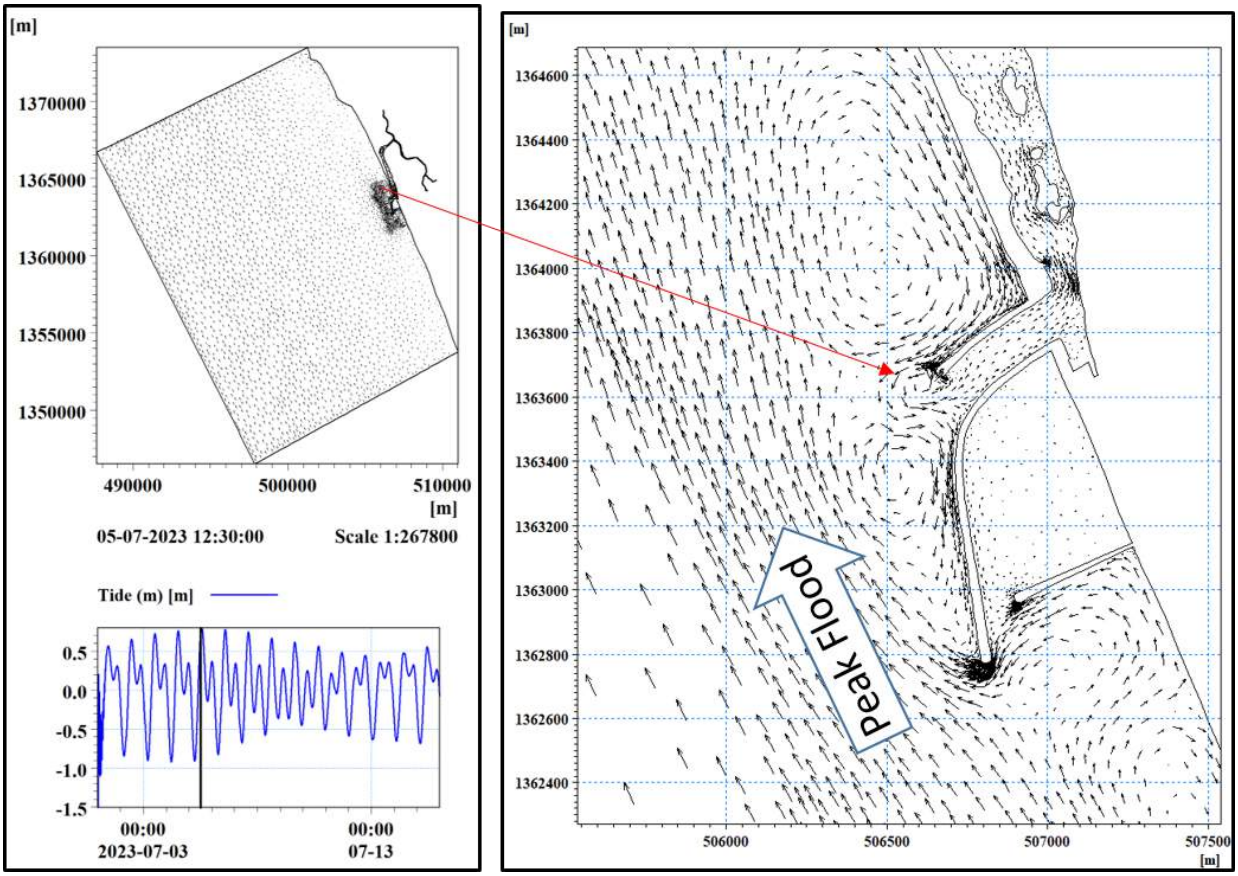


Figure 22: Flow field during peak flood- Monsoon season (Proposed condition)

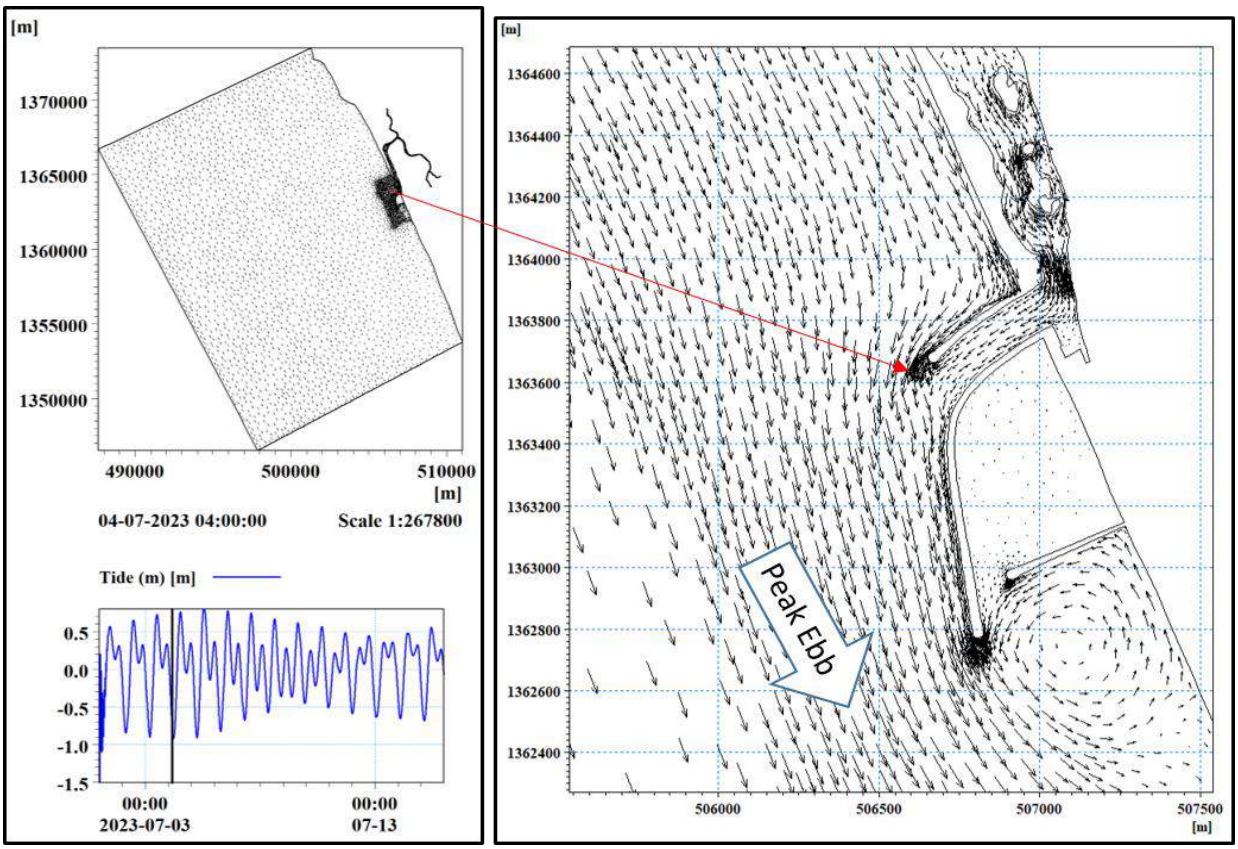


Figure 23: Flow field during peak ebb- Monsoon season (Proposed condition)

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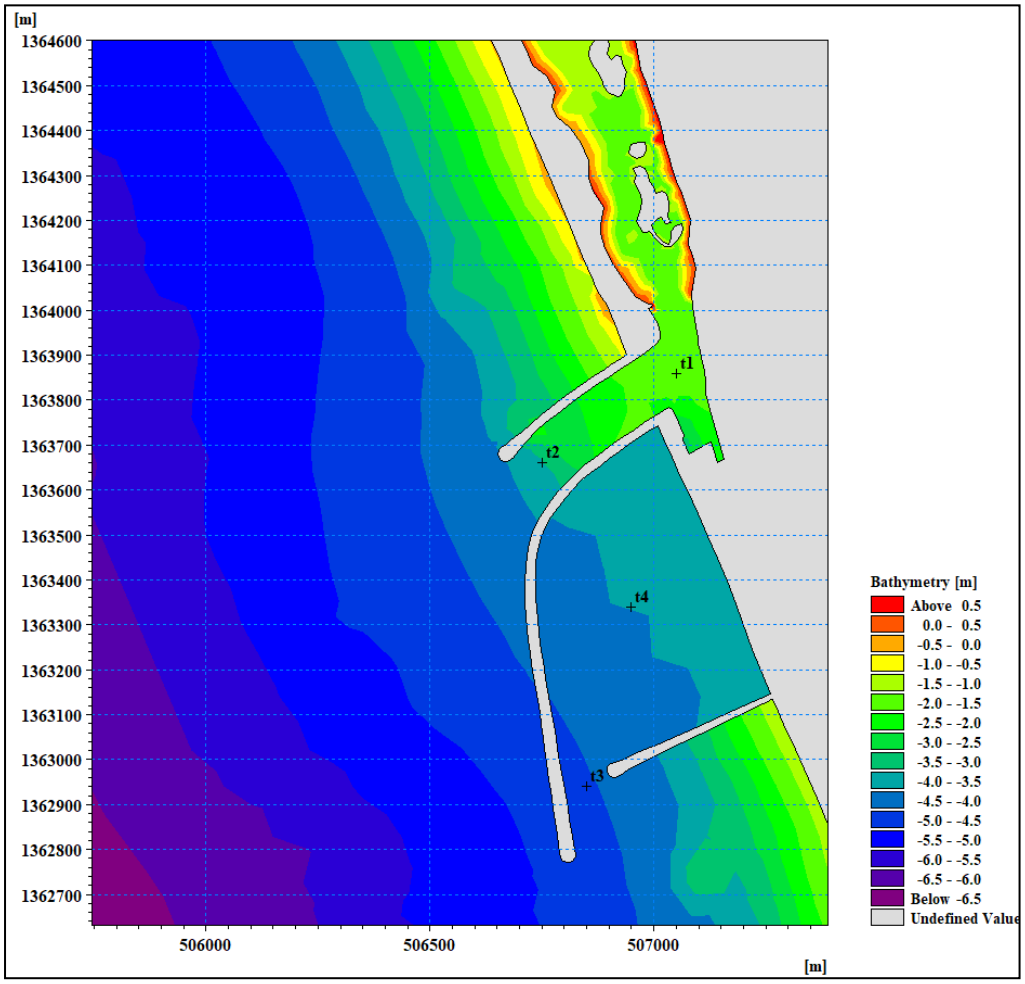


Figure 24: Details of proposed layout with monitoring stations

The computed currents during non-monsoon and monsoon period at all monitoring stations obtained for the proposed layout is compared against the computed currents at corresponding points for the existing condition. The comparison is shown in Fig. 25 and Fig. 26. It is observed from Fig. 25 and Fig. 26 that both during non-monsoon and monsoon season only at the monitoring station t1, there is increase in magnitude (from 0.007 m/s to 0.1m/s during non-monsoon and from 0.015m/s to 0.3m/s during monsoon season) of currents after the proposed construction work. At t2, t3 and t4, the magnitude of currents is significantly reduced after the proposed development. During non-monsoon season, the peak modelled currents at t2, t3 and t4 for existing condition are 0.43m/s, 0.38 m/s and 0.39 m/s respectively. After the proposed development the currents at these three monitoring stations are reduced to 0.11m/s, 0.06m/s and 0.008m/s. However, during monsoon season, at t2, t3 and t4 for existing conditions, the peak modelled currents are 0.55m/s, 0.46m/s and 0.49m/s respectively. The currents at t2, t3 and t4 are reduced to 0.21m/s, 0.11m/s and 0.003m/s after proposed development during monsoon season.

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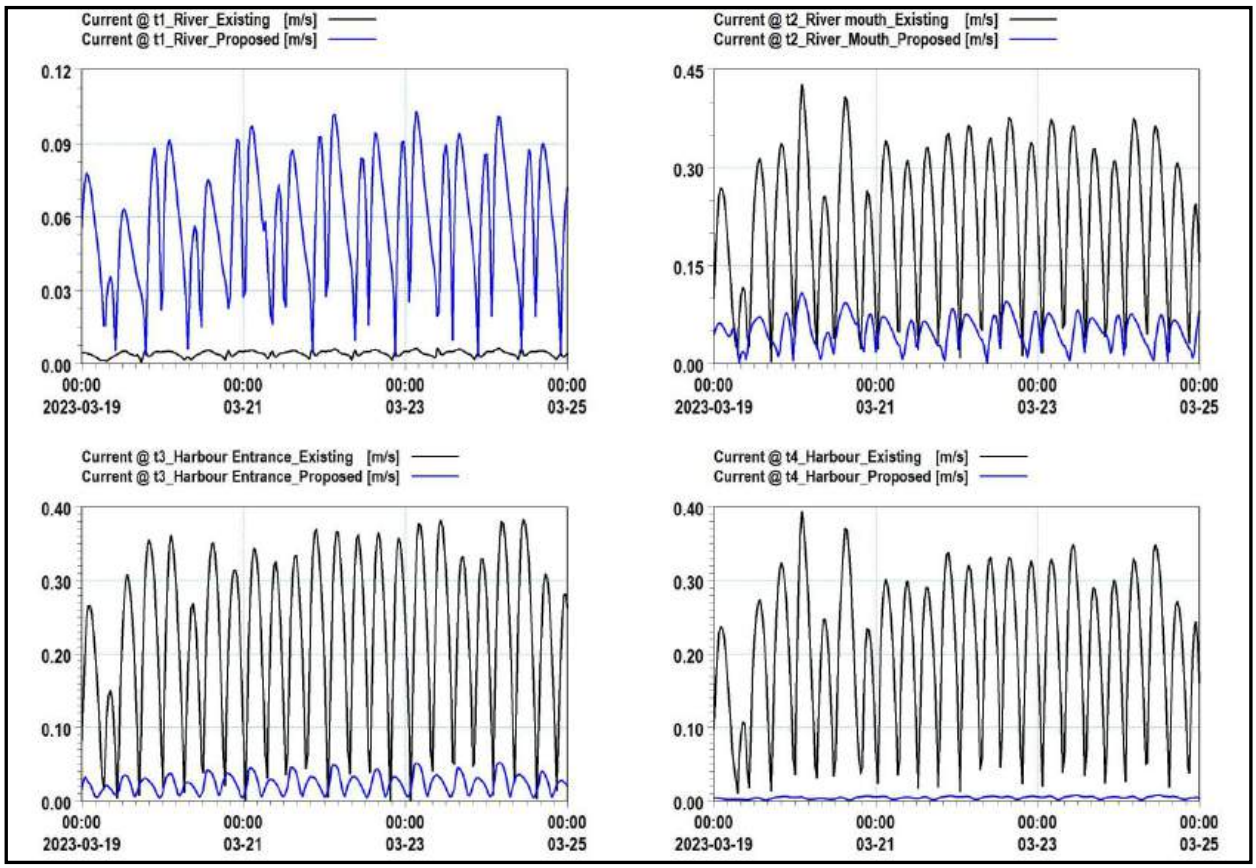


Figure 25: Currents at monitoring stations during Non-monsoon season
(Existing Vs Proposed condition)

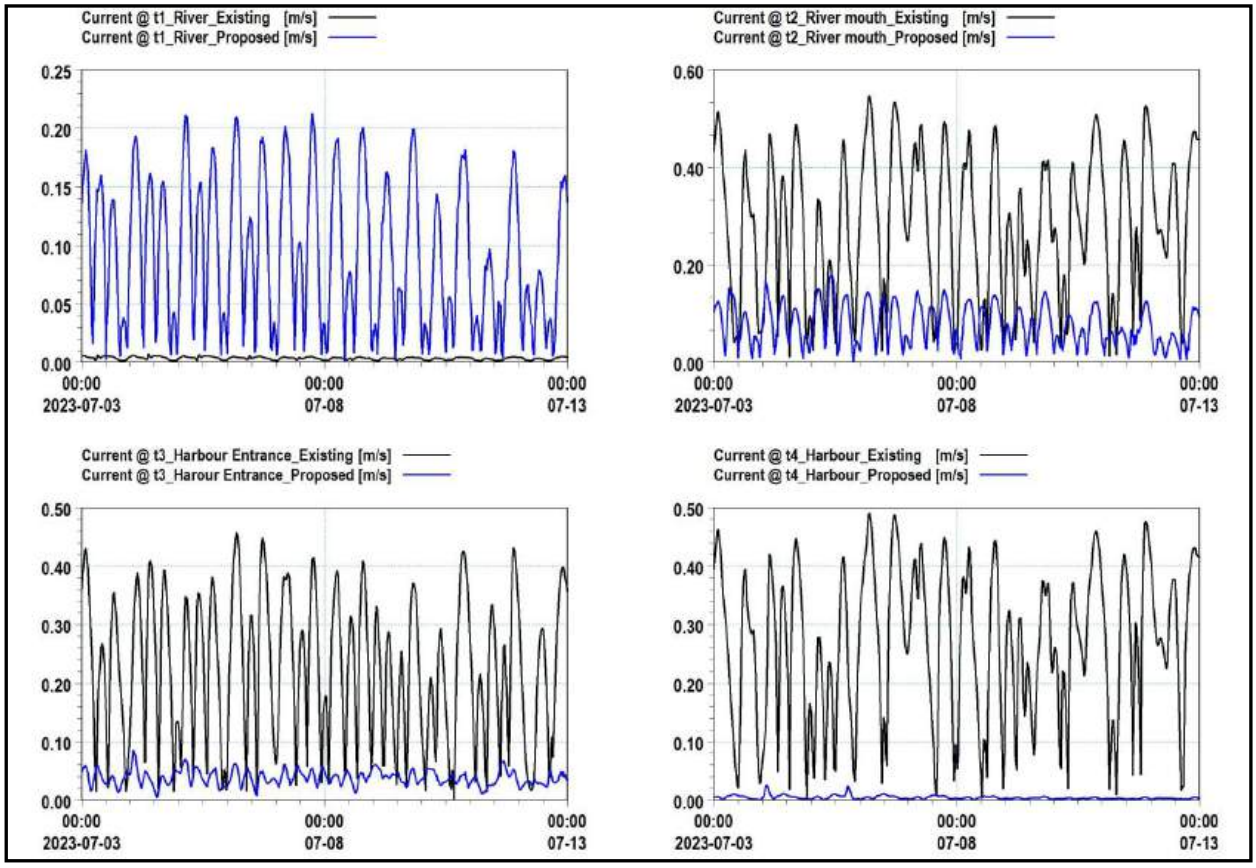


Figure 26: Currents at monitoring stations during Monsoon season
(Existing Vs Proposed condition)

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6.6 Sedimentation Studies – Proposed condition- non-monsoon & monsoon seasons

The sedimentation studies were carried out for the proposed conditions for both non-monsoon and monsoon seasons by using MIKE 21 MT module over a period of one month. The sedimentation pattern during non-monsoon and monsoon seasons are shown in Fig. 27 and Fig. 28 respectively. During the monsoon season, there is slight increase in deposition (Fig. 28) at the river mouth and below the southern breakwater as compared to non-monsoon season. The annual sedimentation estimated in the Fishing Harbour is about 0.03m and at the North and South side of the proposed development annual sedimentation is estimated to be about 0.05m. The annual sedimentation estimated at the river mouth is about 0.045m for the proposed condition. The deposition of sediments near the north and south breakwater is majorly due to formation of circulation at these locations.

The sedimentation estimated is slightly higher in the river mouth region for the proposed condition as compared to the existing condition. The minor increase in sedimentation for the river mouth of proposed condition can be attributed to decrease in currents after establishing the proposed layout.

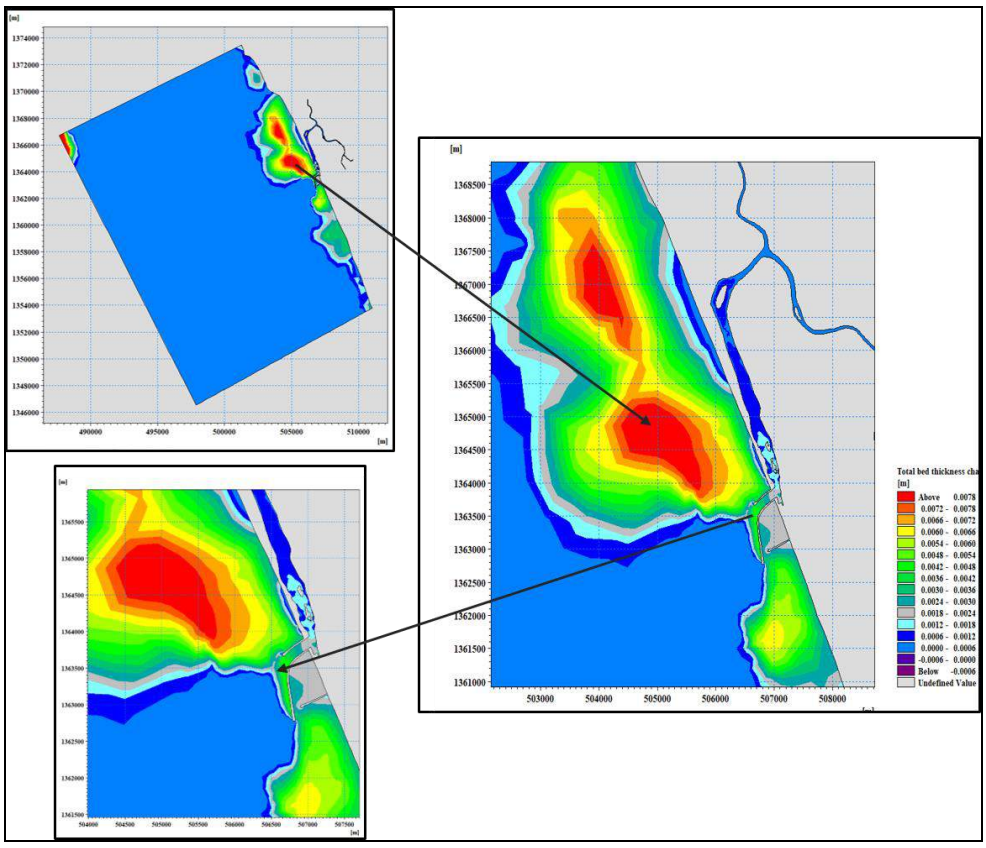


Figure 27: Sedimentation pattern during Non-monsoon season (Proposed)

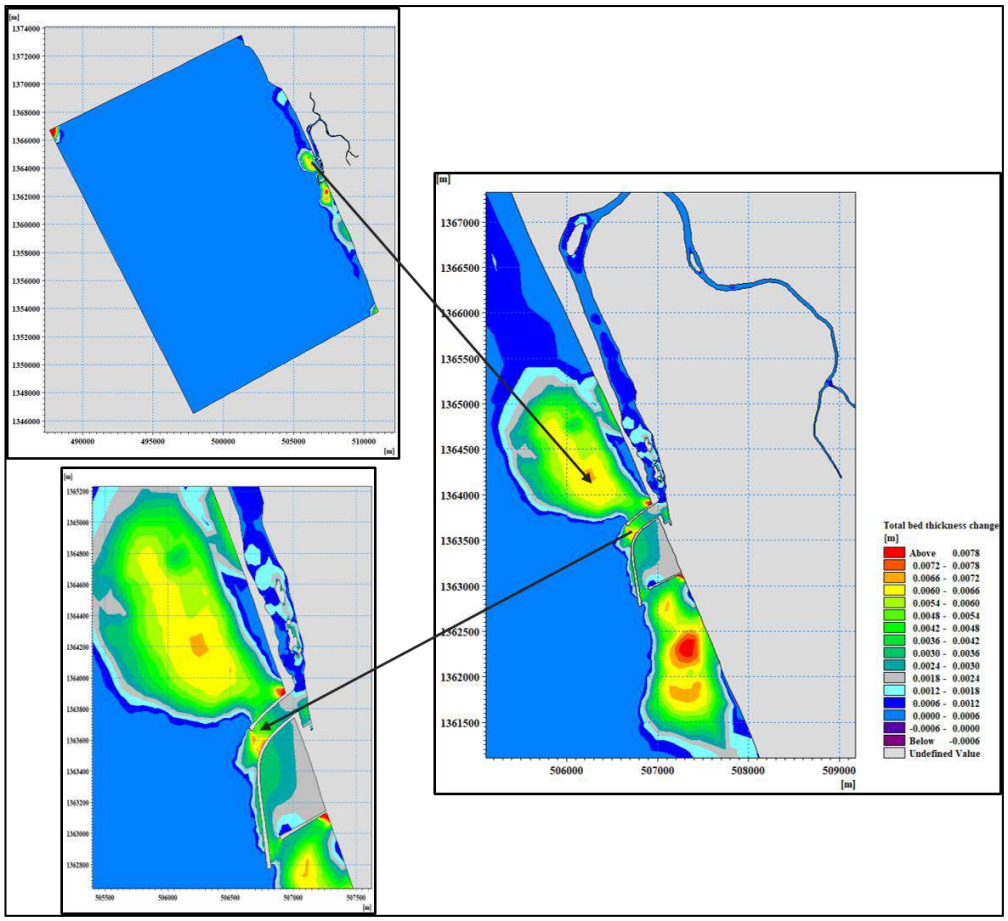


Figure 28: Sedimentation pattern during Monsoon season (Proposed)

6.7 Effect of Littoral Drift

Due to littoral drift, accretion and erosion are taking place on the north and south sides of the proposed development, respectively. The shoreline evolution after 10 years is predicted as accretion on the northern side extending up to 2500m along the shore and about 68m in cross-shore direction, and as erosion on the southern side extending up to 1500m along the shore and about 40m in cross-shore direction. It is observed that the shifting of the river mouth is about 200m towards the north over a year. If the shifting of the river mouth is pronounced after the proposed development of the river training works then a seawall of appropriate length may be provided to arrest the shifting of the river mouth. Similarly, if the erosion on the south side of the proposed fishing harbour is progressive after the development then a suitable shore protection measure in the form of a seawall or series of groynes may be provided.

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7.0 CONCLUSIONS

The mathematical modelling studies for the proposed fishing harbour at Ajanur are undertaken. The simulations of hydrodynamics and sedimentation are performed for the existing conditions and for the proposed layout. Both non-monsoon and monsoon seasons are considered. The major conclusions of the study are given below:-

(i) In the existing condition, the hydrodynamic model results during non-monsoon season shows good calibration of the model with the field observed data.

(ii) The sedimentation studies for the existing condition shows some promising results of sedimentation pattern. Under the existing conditions, the estimated annual sedimentation i.e., depth of deposition is about 0.021m at the river mouth.

(iii) For the proposed development, due to dredging in the proposed area, modelling studies shows decrease in the currents in most of the area of study region (monitoring stations t2, t3 and t4) as compared to the existing condition.

(iv) The sedimentation pattern for the proposed condition shows sedimentation of the order of 0.045m per annum near the river mouth. Sedimentation is also noticed near the north and the south breakwaters (0.05 m in a year). In the fishing harbour area sedimentation of about 0.03 m in a year is estimated.

(v) If the erosion on the south side of the proposed fishing harbour is progressive after the development then a suitable shore protection measure in the form of a seawall or series of groynes may be provided.

(vi) If the shifting of the river mouth is pronounced after the proposed development of the river training works then a seawall of appropriate length may be provided to arrest the shifting of the river mouth.

(vii) The capital dredging in the fishing harbour area, in the river mouth and along the river is calculated to be about 1.1Mm^3. During the construction phase there are debris getting deposited in the dredged area. Therefore, this factor should also be considered for effective planning of construction. Also, maintenance dredging should be carried out near the river mouth and at the harbour entrance to maintain the desired depth for smooth movement of marine vessels.

(viii) The study suggest a proposed layout consisting of 1150m long north breakwater, 425m long south breakwater and 435m breakwater as a river training work near the mouth of Chittari river.

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2. CWPRS Technical Report No.5436, “Wave propagation studies to determine wave climate for the development of fish landing facilities at Ajanur Dist. Kasargod, Kerala” (November 2016).
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Annexure-I













Photographs at Ajanur Fishing Harbour

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WAVE FLUME STUDY REPORT

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जल संसाधन, नदी विकास और गंगा संरक्षण विभाग

DEPARTMENT OF WATER RESOURCES, RIVER DEVELOPMENT AND GANGA REJUVENATION

केंद्रीय जल एवं विद्युत अनुसंधान शाला

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तटीय अभियांत्रिकी संरचनाएं प्रभाग

COASTAL HYDRAULIC STRUCTURES DIVISION

तकनीकी रिपोर्ट संख्या :6177

नवम्बर, 2023

TECHNICAL REPORT NO :6177

NOVEMBER, 2023

केरल के कासारगोड जिले में स्थित अजानूर में मत्स्यन बंदरगाह के लिए तरंगरोधक के डिजाइन के लिए डेस्क और तरंग फ्लूमिका अध्ययन

DESK AND WAVE FLUME STUDIES FOR THE DESIGN OF BREAKWATER FOR FISHERY HARBOUR AT AJANUR IN KASARGOD DISTRICT, KERALA

Dr. R.S. Kankara
Director

REPORT DOCUMENTATION SHEET	
Technical Report No. 6177	**Date: NOVEMBER, 2023**
Title: DESK AND WAVE FLUME STUDIES FOR THE DESIGN OF BREAKWATER FOR FISHERY HARBOUR AT AJANUR IN KASARGOD DISTRICT, KERALA	
Officers Responsible for Conducting the Studies: These studies were conducted by Shri S. R. Tayade, Scientist 'D' with the assistance of Dr. Praveen K. M., Scientist 'B', Shri S. P. Jagtap, Assistant Research Officer, Shri S. R. Pardeshi, Shri Deepak Sharma, Research Assistants, Shri Sushant Gupta, LA-II under the supervision of Dr. J. Sinha, Scientist 'E' & Shri A. V. Mahalingaiah, Scientist 'E' and Dr. Prabhat Chandra, Additional Director and overall guidance of Dr. R. S. Kankara, Director, CWPRS, Pune. Shri Prabhakar Chary, Scientist 'C', Mrs. R.S. Ananda, Scientist 'B', Mrs. M. C. Pawar, Assistant Engineer, Shri Yognath, J.E. of RSWG group were associated, while conducting the wave flume studies at CWPRS.	
Name and Address of Organization Conducting the Studies **Coastal Hydraulic Structures Division** **Central Water and Power Research Station, Pune, India**	
Name and Address of Authority Sponsoring the Studies: **Chief Engineer,** **Harbour Engineering Department,** **Kamaleswaram, Manacaud,** **Thiruvananthapuram** **Kerala – 695009**	
Synopsis Harbour Engineering Department, Government of Kerala has a proposal to develop a fishing harbour at Ajanur. In view of this, Chief Engineer, Harbour Engineering Department, Govt of Kerala referred hydraulic model studies to CWPRS for the proposed fishing harbour at Ajanur. The studies were undertaken and the Mathematical Model Studies for wave tranquility at the proposed fishing harbour at Ajanur was carried out at CWPRS, Pune. Based on the Mathematical Model Studies, it was suggested to construct 1150 m long north breakwater and 425 m long south breakwater. Accordingly, desk & wave flume studies were conducted to evolve the cross-section of breakwater based on the actual site survey data and other hydraulic parameters. Design of breakwater with tetrapods in the armour was evolved based on the desk and wave flume studies. The design of breakwater at -4.50 m bed level consists of 6.0 t tetrapod in the seaside armour placed on 1:2 slope in double layer from el. +0.0 m to el. +7.0 m. A 7.0 m wide and 0.5 m thick crest slab with 0.5 m thick parapet wall is proposed at el. +8.5 m. The top of crest slab and parapet wall is kept at el. +7.0 m and +8.0 m respectively. A 6.0 m wide toe-berm is provided at el. +0.0 m consists of 2.0 t to 3.0 t stones with a sea side slope of 1:2. The hydraulic stability tests were conducted in the wave flume by reproducing the section to a Geometrically Similar (GS) model scale of 1:29. For the design of breakwater, water level of 2.60 m was considered as the Design Water Level (DWL), 1.40 m above the HWL (Storm Surge + Sea level rise). The significant wave height of 4.0 m was considered for the design of breakwater.	
Keywords Breakwater, Storm Surge, Armour, Tetrapod's, Toe-Berm etc.	

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Photo 6 : Random wave test with H_s = 3.76 m at MLLW = +0.40 m

Photo 7 : Regular wave test with $H_{1/3}$ = 5.0 m at DWL = +2.60 m, t = 10 sec

Photo 8 : Regular wave test with $H_{1/3}$ = 5.12 m at MHHW = +1.40 m, t = 12 sec

Photo 9 : Regular wave test with $H_{1/3}$ = 5.0 m at MHHW = +1.40 m, t = 10 sec

Photo 10 : Regular wave test with $H_{1/3}$ = 5.0 m at MHHW = +1.40 m, t = 8 sec

Photo 11 : Regular wave test with $H_{1/3}$ = 5.07 m at MSL = +1.00 m, t = 10 sec

Photo 12 : Regular wave test with $H_{1/3}$ = 4.80 m at MLLW = +0.40 m, t = 10 sec

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DESK AND WAVE FLUME STUDIES FOR THE DESIGN OF BREAKWATER FOR FISHERY HARBOUR AT AJANUR IN KASARGOD DISTRICT, KERALA

TECHNICAL REPORT NO. 6177	MONTH: NOVEMBER, 2023

1.0 INTRODUCTION

Ajanur village (Latitude 12.33° N and Longitude 75.18° E) in Kasargod District of Kerala is situated on the west coast of India, 15 km south of the district headquarter (Fig. 1). Harbour Engineering Department, Government of Kerala has a proposal to develop a fishing harbour at Ajanur. In view of this, Chief Engineer, Harbour Engineering Department, Govt of Kerala has referred hydraulic model studies to CWPRS for the proposed fishing harbour at Ajanur.

Based on these requirements, Mathematical Model Studies for wave tranquility for the proposed fishing harbour at Ajanur was carried out at CWPRS, Pune (Technical Report No. 5436 of Nov 2016). As per the layout no. 4 suggested in CWPRS Technical Report the harbour basin area comes out to be about 19 ha. Considering the suggestions given by the Technical Sanction committee of PMMSY schemes, Harbour Engineering Department proposed to increase the basin area upto 26 ha. Accordingly, Additional Mathematical Model Studies for wave tranquility (CWPRS Technical Note, July 2022) has been carried out for the proposed increased area. Based on the Mathematical Model Studies, it was suggested to construct 1150 m long north breakwater and 425 m long south breakwater.

Accordingly, desk studies were conducted for evolving the conceptual cross-section of the breakwater using empirical methods and past experience of CWPRS and considering the hydraulic/site conditions such as bathymetry, tides and waves prevailing at site. Thereafter, the wave flume studies were conducted for assessing the hydraulic stability of the proposed breakwater cross-section at Ajanur, Dist. Kasargod, Kerala.

This report describes in detail the desk & the wave flume studies carried out to evolve design of the breakwater for achieving tranquil condition in the proposed fishing harbour at Ajanur, Kerala.

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3.0 SCOPE OF STUDIES

For the proposed development of fishery harbour at Ajanur in Kasargod district of Kerala, the following hydraulic model studies entrusted to CWPRS by Chief Engineer, Harbour Engineering Department, Thiruvananthapuram:

1. Additional Mathematical Model Studies for wave tranquility for the revised layout of fishery harbour at Ajanur, Kerala.
2. Desk and wave flume studies for the design of breakwater for fishery harbour at Ajanur in Kasargod district, Kerala.

On the basis of Mathematical Model Studies for wave tranquility for the proposed fishery harbour at Ajanur, 1150 m long north breakwater and 425 m long south breakwater are suggested as shown in Fig. 2.

The scope of the present studies includes evolving the conceptual design for the suggested breakwater based on empirical methods and the conditions prevailing at the site. Further, the conceptual design of the breakwater was assessed for its hydraulic stability by conducting wave flume tests for various design wave conditions.

3.0 SITE CONDITIONS

Ajanur village in Kasargod District is situated about 15km south of district headquarter at Latitude 12.33° N and Longitude 75.18° E in Kerala state. Majority of village population belongs to fishermen community. At present, the fisherman are operating their boats in open sea & they are facing difficulties in navigating the vessels due to shallow depth & direct wave action.

In view of this, Harbour Engineering Department, Govt of Kerala has a proposal to construct a fishery harbour south of the Chittari River mouth at Ajanur in Kasargod district, Kerala.

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4.0 DESIGN CONDITIONS

4.1 Tidal Levels

The tides in the region are semidiurnal in nature. The maximum tidal range at Kasargod is about 1.0 m. The tidal currents are generally parallel to the coastline. The following tidal levels at Kasargod have been considered for the wave flume studies (Reference: Admiralty Chart No. 217 of 2019):

Table 1: Normal Tidal Levels at Kasargod, Kerala

Tides	Level w.r.t Chart Datum
Mean Higher High Water (MHHW/HWL)	+1.40 m
Mean Lower High Water (MLHW)	+1.30 m
Mean Sea Level (MSL)	+1.00 m
Mean Higher Low Water (MHLW)	+0.90 m
Mean Lower Low Water (MLLW/LLWL)	+0.40 m

A Design Water Level (DWL) of 2.60 m was considered including MHHW and 1.20 m above the MHHW i.e Storm Surge (0.80 m) + Sea level rise (0.40 m). These water levels are with respect to Chart Datum (CD). The design of breakwater cross-sections was also tested at HWL, MSL and LLWL water levels.

4.2 Design Wave Conditions

The predominant wave direction at proposed site in Kasargod district is SSW. Following design conditions were considered for the stability of the breakwater against wave attack and to provide tranquil condition in the harbour area:

1. Zero-order (0 to 1 %) damage for the significant wave height of 4.0 m at +2.60 m (DWL) and +1.40 m (HWL).
2. Overtopping is not permitted.
3. The wave periods considered for the tests are 8, 10 and 12 seconds.
4. The stability of the section is also to be assessed at an intermediate water level and low water level.

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5.0 DESIGN OF BREAKWATER

The desk and wave flume studies have been conducted for evolving cross-section of the breakwater with tetrapods in the armour layer based on empirical formulae, existing conditions at the site and previous in-house extensive wave flume studies conducted at CWPRS for hydraulic stability of breakwater. The weight of armour units are basically evaluated based on Hudson's formula (as given below):

$$W = \frac{w_r . H_s^3}{K_D \times (Sr-1)^3 . \cot\theta}$$

Where,

H_s = Breaking wave height (m)
W = Weight of Armour (t)
w_r = Unit Weight of Armour (t/m^3)
K_D = Stability Coefficient for Breaking Wave Height
Sr = Specific Gravity of Armour relative to Water at the structure (w_r / W_w)
W_w = Unit wt. of sea water (t/m^3)
Cot θ = Slope of armour

The conceptual design cross-section of the breakwater with tetrapods in the armour were evolved based on the desk studies as shown in Fig. 4. The design of breakwater at -4.50 m bed level consists of 6.0 t tetrapod in the seaside armour placed on 1:2 slope in double layer from el. +0.0 m to el. +7.0 m. A 7.0 m wide crest slab with 0.5 m thick parapet wall is proposed with top el. +7.0 m. The top of parapet wall is kept at el. +8.0 m. A 6.0 m wide toe-berm is provided at el. +0.0 m consists of 2.0 t to 3.0 t stones with a sea side slope of 1:2. Secondary layer consists of 0.5 – 1.0 t stones below the armour layer and 200 – 300 kg stones below the toe-berm armour. A 0.30 m thick bedding layer consisting of stones up to 20 kg is provided at -4.50 m bed level.

6.0 HYDRAULIC MODEL STUDIES

6.1 Random Sea Wave Flume

The random sea wave flume having dimensions 90 m (length) x 2 m (width) x 1.50 m (height) was utilised for the wave flume tests as shown in Annexure-I / Photo 1. The system is capable of generating maximum wave height

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of 0.4 m at a water depth of 0.6 m for wave periods ranging between 0.3 and 3 sec. The flume facility is equipped with a fully automated computerised random wave generating system comprising of computer, hydro-servo system and wave board assembly. The command signals are sent by computer to the servo-valve through which pressurised oil supplied by hydraulic power pack flows into the actuator. A *To* and *Fro* motion of the piston drives the wave board, which in turn generates waves in the flume.

6.2 Wave Measurement and Calibration

The wave heights were measured by capacitance type wave probes. A gauge was fixed in front of the model and was analysed by computer. The desired wave conditions in front of the model were obtained by matching of desired spectrum and achieved spectrum by iterative procedure.

6.3 Wave Flume Test Procedure

The cross-section of the breakwater was tested under a normal attack of waves in a 2-D wave flume for its hydraulic stability (Photo 1). The model of breakwater cross-section was constructed to a Geometrically Similar (GS) scale in the wave flume. The dimensions of the random wave flume are 90 m length, 2 m width and 1.5 m depth wherein both regular as well as random waves of desired wave height/wave period and desired standard wave spectrum respectively can be generated. Before starting the test, the number of tetrapods provided in the armour and stones in the toe-berm were counted. After conducting the tests for one-hour duration, the number of tetrapods/stones, if any, displaced from its original position were recorded and percentage of damage to the armour/toe-berm of breakwater was determined. During the test, the extent of splashing/overtopping over the crest was also recorded. The damage is expressed as percentage of number of tetrapods/stones displaced from their position. The percentage of damage is equal to "Number of units displaced/total no. of units used in the respective layer".

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6.4 Model Scale

The model tests for design of cross-section of the breakwater were conducted in 2-D wave flume by reproducing the section to a Geometrically Similar scale of 1:29. The model was based on Froude's criterion of similitude. Various scales obtained are as follows:

Table 2: Scale Ratio for Model Studies of the Breakwater

Model scale 1:29		
Length	$-L_r$	= 1:29
Area	$-L_r^2$	= 1:841
Volume	$-L_r^3$	= 1:24389
Time	$-L_r^{1/2}$	= 1:5.385
Velocity	$-L_r^{1/2}$	= 1:5.385

6.5 Gradation of Stones

Details of various gradations of stones in prototype of the trunk of the breakwater and those used in the model having scale 1:29 are given table 3:

Table 3: Gradation of Stones for Trunk of Breakwater

Prototype		Model (Scale 1:29)	
Average	**Gradation**	**Average**	**Gradation**
2.5 t	2 – 3 t	100 gm	80 to 120 gm
1.5 t	1 – 2 t	60 gm	40 to 80 gm
0.75 t	0.5 – 1 t	30 gm	20 to 40 gm
250 kg	200 – 300 kg	10 gm	8 to 12 gm

6.6 2-D Wave Flume Tests

The cross section of the breakwater, as shown in Fig. 4, was constructed with a Geometrically Similar model scale of 1:29 in the wave flume. Tests were conducted considering both random and regular wave conditions to assess the stability of the breakwater. For random waves, 4.0 m significant wave height (H_s) was considered. To achieve this H_s, Pierson-Moskowitz (PM) spectrum was used for acquiring desired wave height in the 90 m wave flume. For acquiring desired

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regular wave height i.e. non breaking wave height in front of the breakwater, series of wave height analysis was carried out with the help of in-house computer program.

The tests were carried out at CWL, MHHW, MSL & MLWL with various wave conditions. The tests were conducted for one-hour duration each in the model corresponding to about 5.39 hours (approx.) in the prototype. The objectives of the tests were to check hydraulic stability of the breakwater against various wave conditions likely to occur in the vicinity of proposed fishery harbour area at Ajanur, Kasargod district.

The details of the wave flume tests were conducted for breakwater cross-section at -4.50 m bed level with random waves are described as follows:

1) Initially, a test was conducted with random waves at a significant wave height (H_s) of 4.05 m at Design Water Level (+2.60 m) for one hour duration (corresponding to 5.39 hours in prototype) using PM (Pierson-Moskowitz) spectrum. There was no overtopping and moderate splashing observed during the test. The test showed that there was no damage occurred to both armour layer and toe-berm (Photograph No. 2).

2) An endurance test was conducted at Design Water Level (+2.60 m) with random waves using PM (Pierson-Moskowitz) spectrum for the significant wave height of 4.85 m (120% of H_s i.e. 4.80 m) for one hour duration. During the test, it was observed that there was moderate splashing but no overtopping. After conducting the test for one hour duration, no damage was observed in the armour and the toe-berm (Photograph No. 3).

3) Further, a test was conducted with random waves at a significant wave height (H_s) of 4.0 m at the Mean Higher High Water (MHHW) (+1.40 m) for one hour duration using PM (Pierson-Moskowitz) spectrum. There was no splashing and no overtopping observed during the test. After the test, it was observed that there was no damage occurred in the armour as well as in the toe-berm (Photograph No. 4).

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4) Another test was conducted with random waves at a significant wave height (H_s) of 3.97 m at Mean Sea Level (+1.00 m) for one hour duration (corresponding to 5.39 hours in prototype) using PM (Pierson-Moskowitz) spectrum. During the test, no splashing and no overtopping was observed. There was no damage to the toe-berm as well as to the armour observed after the test (Photograph No. 5).

5) A test was conducted with random waves at a significant wave height (Hs) of 3.76 m at Mean Lower Low Water Level (+0.40 m) for one hour duration (corresponding to 5.39 hours in prototype) using PM (Pierson-Moskowitz) spectrum. No splashing and no overtopping were observed during the test. After the test, it was observed that there was no damage to the toe- berm as well as to the armour (Photograph No. 6).

From the past experiences during the model testing, it has been revealed that many-times the structures were also susceptible to undergone damages during the regular wave conditions, therefore the cross-section of breakwater was also tested in the regular wave conditions.

The details of **regular wave testing** on the breakwater cross-section are as follows:

6) A test was conducted, at the Design Water Level of +2.60 m under the attack of regular waves of 10 sec period with wave height (H_{10}) of 5.0 m. There was minor overtopping and moderate splashing of waves observed during the test. The maximum wave run-up was upto +5.85 m and run-down was up to +0.72 m were observed. After conducting the test under the condition for one hour in the wave flume, no damage was observed in the armour layer and in the toe-berm (Photograph No. 7).

7) A test was also carried out under the attack of regular (monochromatic) waves at Mean Higher High Water (+1.40 m). The duration of test was one hour in the model corresponding to about 5.39 hours in the prototype. The test was conducted for wave height of (H_{10}) of 5.12 m with 12 second period. During the test, it was noticed that the maximum wave run-up was upto +5.0 m and run-down was up to +0.15 m. There

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was no damage observed to the toe-berm stones and to the armour layer after the test. There was no splashing and no overtopping of waves observed (Photograph No. 8).

8) Further, a test was conducted for one hour duration at Mean Higher High Water (MHHW) of +1.40 m under the attack of regular waves of 10 sec period with wave height (H_{10}) of 5.0 m. During the test, no overtopping and no splashing was observed. The maximum wave run-up was upto +5.10 m and run-down was up to [-] 0.20 m. No damage was observed in the armour layer and in the toe-berm (Photograph No. 9).

9) Another test was conducted for one hour duration at Mean Higher High Water (MHHW) of +1.40 m under the attack of regular waves of 8 sec period with wave height (H_{10}) of 5.0 m. During the test, no splashing and no overtopping was observed. The max wave run-up was up to +4.25 m and run-down up to +0.00 m were observed. After conducting the test, there was no damage observed in the armour layer and toe-berm (Photograph No. 10).

10) A test was also carried out under the attack of regular (monochromatic) waves at Mean Sea Level (+1.00 m). The duration of test was one hour in the model corresponding to about 5.39 hours in the prototype. The test was conducted for wave height of 5.07 m (H_{10}) with 10 second period. During the test, it was observed that the maximum wave run-up and run-down was up to +3.50 m and up to (-) 0.50 m respectively. There was no damage observed in the toe-berm as well in the armour. No splashing and no overtopping of waves were observed (Photograph No. 11).

11) Another test was conducted for one hour duration at Mean Lower Low Water Level (MLLW) of +0.40 m under the attack of regular waves of 10 sec period with wave height (H_s) of 4.80 m. During the test, no splashing and no overtopping was observed. The max wave run-up was up to +3.50 m and run-down up to (-) 1.10 m were observed. After conducting

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the test, there was no damage observed in the armour layer and toe-berm (Photograph No. 12).

All results of tests conducted for the cross-section of the breakwater (trunk portion) are summarized in the Table 4, and photographs of all the tests are enclosed as Annexure-V.

Overall, the cross-section of the breakwater was found stable against the higher wave action at high water level. No damage to the toe-berm and to the armour layer of breakwater were observed during the tests. Therefore, the section was found to be hydraulically stable against the design wave conditions adopted for the design of the proposed breakwater for fishery harbour at Ajanur, Dist. Kasargod, Kerala.

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Table 4: Summary of the Wave Flume Test conducted at RSWS

Name of the Project – Breakwater for fishery harbour at Ajanur in Kasargod district, Kerala
Model Scale = 1:20, Armour Unit = 6 t Tetrapod, Toe-Berm = Stone (2 – 3 t)
DWL = +2.60 m, MHHW = +1.40 m, MSL = +1.00 m, MLLW = +0.40 m
Test Duration = 1 hour (3.39 Hrs Proto), Bed Level = -4.50 m
Spectrum - Pierson-Moskowitz Spectrum

Sr. No	Water Level	Wave Height	Splashing	Over-topping	Run-up	Run-down	Damage		Remark	Photograph No.
							Toe-berm	Armour		
Random Wave Tests										
1	DWL	H_s = 4.05 m	Moderate	Nil	N.A.	N.A.	Nil	Nil		3
2	DWL	H_s = 4.85 m	Moderate	Nil	N.A.	N.A.	Nil	Nil	Endurance Test	3
3	MHHW	H_s = 4.8 m	Nil	Nil	N.A.	N.A.	Nil	Nil		4
4	MSL	H_s = 3.97 m	Nil	Nil	N.A.	N.A.	Nil	Nil		5
5	MLLW	H_s = 3.76 m	Nil	Nil	N.A.	N.A.	Nil	Nil		6
Regular Wave Tests										
6	DWL	H_{sig} = 5.0 m	Moderate	Minor	Upto +5.85 m	Upto +0.72 m	Nil	Nil	T = 10 sec	7
7	MHHW	H_{sig} = 5.02 m	Minor	Nil	Upto +5.8 m	Upto +0.15 m	Nil	Nil	T = 12 sec	8
8	MHHW	H_{sig} = 5.0 m	Nil	Nil	Upto +5.10 m	Upto [-]0.20 m	Nil	Nil	T = 10 sec	9
9	MHHW	H_{sig} = 5.0 m	Nil	Nil	Upto +4.25 m	Upto +1.0 m	Nil	Nil	T = 8 sec	10
10	MSL	H_{sig} = 5.07 m	Nil	Nil	Upto +3.50 m	Upto [-]0.50 m	Nil	Nil	T = 10 sec	11
11	MLLW	H_s = 4.80 m	Nil	Nil	Upto +3.50 m	Upto [-]1.32 m	Nil	Nil	T = 10 sec	12

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7.0 RECOMMENDED CROSS-SECTIONS OF THE BREAKWATER

After conducting several tests, the cross-section of the breakwater at -4.50 m bed level was found stable against various wave conditions. The details of the cross-section of the breakwater at various bed levels are as follows:

1)Trunk Portion at -2.0 m Bed Level (to be adopted from -2.0 m to +0.0 m Bed level)

The cross-section is designed for the -2.0 m bed level as shown in Fig. 3. This cross-section may be adopted from -2.0 m to +0.0 m bed level range. The cross-section of the breakwater consists of 2 t tetrapods provided in the armour layer with 1:2 slope on the sea-side from el. +2.20 m to +7.0 m and 0.5 to 1.0 t stones provided in the armour with 1:2 slope on the leeside. A 4.0 m wide toe-berm on the seaside consists of 0.5 to 1 t stones is kept at el. +2.20 m. Secondary layer consists of 200 to 300 kg stones provided below the armour layer and 50 to 100 kg stones provided below the toe-berm and leeside armour. Core consists of 20 to 50 kg stones and 0.30 m thick bedding layer consists of stones up to 20 kg. A PCC crest of 0.5 m thick is provided at el. +6.50 m soffit level with sea-side parapet top at el. +8.0 m. A clear carriageway width of 7 m is provided on the crest slab for the movement of vehicles / machineries in future during the inspection / supervision or maintenance purpose.

2) Trunk Portion at -4.50 m Bed Level (to be adopted from -3.0 m to -4.50 m Bed level)

The cross-section of breakwater at -4.50 m bed level is shown in Fig. 4. The cross-section of the breakwater consists of 6 t tetrapods provided in the armour layer with 1:2 slope on the sea-side from el. +0.0 m to +7.0 m and 1 to 2 t stones provided in the armour with 1:2 slope on the leeside. A 6.0 m wide toe-berm on seaside is kept at el. +0.0 m consists of 2 to 3 t stones. The secondary layer consists of 0.5 to 1.0 t stones provided below the armour layer and 200 to 300 kg stones provided below the toe-berm and 100 to 200 kg stones provided below the leeside armour. Core consists of 20 to 100 kg stones and 0.30 m thick bedding layer consists of stones up to 20 kg is provided at

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-4.50 m bed level. A 7.0 m wide PCC crest slab of 0.5 m thick is provided at el. +6.50 m soffit level with sea-side parapet top at el. +8.0 m.

3) Roundhead at -4.50 m Bed Level

The cross-section and plan of roundhead portion of breakwater at -4.50 m bed level are shown in Figs. 5 & 6 respectively. The section consists of 8 t tetrapods placed in the armour (double layer) on 1:2 slope and are supported with the 6.0 m wide toe-berm consisting of 3 to 4 t stones at el. +0.0 m. A 8.0 m wide PCC crest slab is provided with top el. +8.0 m. A clear carriageway width of 6 m is provided on the crest slab for the movement of vehicles / machineries in future during the inspection / supervision or maintenance purpose. Secondary layer consists of 0.5 to 1.0 t stones provided below the armour layer and below the toe-berm. Core consists of 20-100 kg stones. A 0.3 m thick bedding layer is provided with stones upto 20 kg.

8.0 CONCLUDING REMARKS AND RECOMMENDATIONS

Based on the desk and the wave flume studies carried out for design of the breakwater for fishery harbour at Ajanur in Kasargod District, Kerala, the following concluding remarks are drawn:

1. The recommended cross-section of the breakwater with tetrapods in the armour layer is shown in Fig. 3 to Fig. 6. The cross section is hydraulically stable under the design wave conditions & therefore, recommended to implement at the proposed site.
2. The end of the breakwater should be protected by providing proper roundhead as shown in Figs. 5 & 6. The construction phasing may be adhered, in order to have a safety and economy of the project. If, the construction of the breakwater may not be possible during one season, as such, a temporary roundhead at the end portion may be provided wherever the work is curtailed.
3. The density of concrete and stones to be used for construction of the breakwater should be about 2.4 t / m^3 and 2.6 t / m^3, respectively.

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4. There should not be any deviation from the design during the construction of the breakwater in respect of levels, slopes and weights of the stones.

5. The crest slab and the parapet wall provided at the crest of the breakwater may be constructed monolithically.

6. The packing density of the 2 t Tetrapods, 6 t Tetrapods and 8 t Tetrapods (double layer) in the armour layer of breakwater is 117 Nos., 56 Nos. and 47 Nos. per 100 sq. m. of area. The specification of 2 t Tetrapods, 6 t Tetrapods and 8 t Tetrapods are enclosed as Annexure-II, III and IV respectively.

7. All levels of the proposed breakwater should be correlated with Chart Datum before construction at the site.

8. The grading of the stones to be used in the construction for the breakwater should be as follows :

2 – 3 t stones	-	50% stones should be higher than 2.50 t
1 – 2 t stones	-	50% stones should be higher than 1.50 t
0.5 – 1 t stones	-	50% stones should be higher than 0.75 t
200 – 300 kg stones	-	50% stones should be higher than 250 kg
100 – 200 kg stones	-	50% stones should be higher than 150 kg
20 – 100 kg stones	-	75% stones should be higher than 60 kg

9. The rubble mound structures are flexible structures and it is essential to monitor and maintain them regularly. Therefore, periodic survey of the breakwater and maintenance of the breakwater, as and when any damage occurs may be undertaken.

10. It is suggested to carry out geotechnical investigations to check the probable sinkage at the site before the construction of the breakwater.

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Fig. 1: Index and Location Map of Ajanur, Kasargod District, Kerala.

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Fig. 2: Layout Plan for Proposed Fishing Harbour at Ajanur, Kasargod District, Kerala

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Fig. 3: Design Cross-Section of Breakwater at -2.0 m Bed Level at Ajanur, Kasargod District, Kerala

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Fig. 4: Design Cross-Section of Breakwater at +4.50 m Bed Level at Ajanur, Kasargod District, Kerala

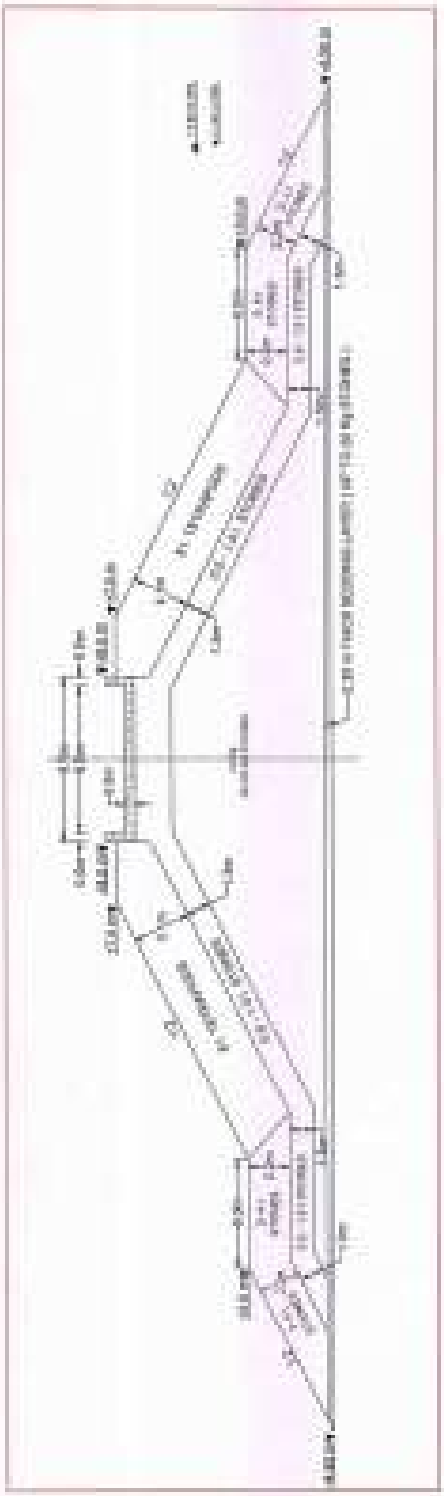
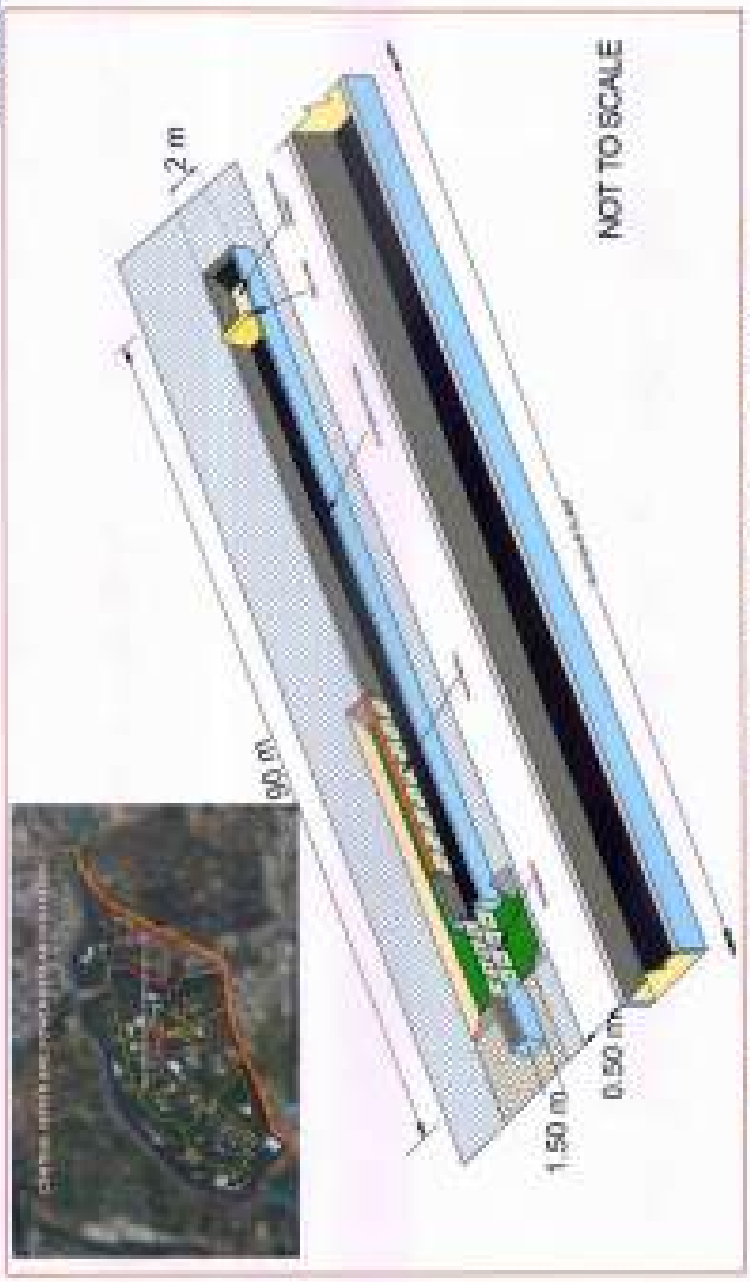


Fig. 5: Roundhead Section of Breakwater at -4.50 m Bed Level at Ajanur, Kasargod District, Kerala

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Fig. 6: Plan of Roundhead portion of Breakwater at -4.50 m Bed Level at Ajanur, Kasargod District, Kerala



Random Sea Wave Generation Flume (90 m) Facility at CWPRS, Pune

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Annexure – II

Specification for 2 t Tetrapod

CWPRS Technical Report No. 8177 of November 2023

TETRAPOD SPECIFICATION

ELEVATION

PLAN

BOTTOM

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Annexure – III

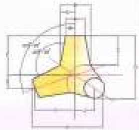
TETRAPOD SPECIFICATION

For 6 T Tetrapod

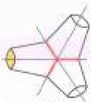
Wt. of Tetrapod	W =	6	T
Density of Concrete	w =	2.4	t/cu. m
Vol. of Tetrapod	V =	2.500	Cu. meter
Overall dim. of Tetrapod	H =	2.058	meter

Dimensions of Armour Units in meter

A	0.302*H	0.62
B	0.151*H	0.31
C	0.477*H	0.98
D	0.470*H	0.97
E	0.235*H	0.48
F	0.544*H	1.12
G	0.215*H	0.44
I	0.606*H	1.25
J	0.303*H	0.62
K	1.091*H	2.25
L	1.201*H	2.47



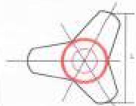
ELEVATION



BOTTOM

Armour layer Thickness (2 Units) = 1.561 * H (Double Layer)

Le = 3.203 meter



PLAN

Placing Density (N)

Number Of Tetrapods (Two Layers, Random Placed) Per Unit Area

$N = n * Kt * (1-P/100) * (w/W)^{2/3}$

Where

Layer coeff.	Kt =	1.04	constant	N =	0.885	per sq. m. area
Porosity	P=	50	%	N =	89	per 100 sq. m. area
No. of Layers	n=	2	nos.			

Specification for 6 t Tetrapod

Annexure – IV

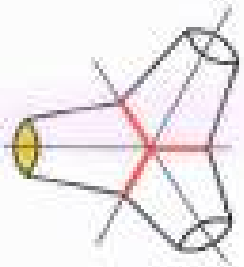
TETRAPOD SPECIFICATION

For 8 T Tetrapod

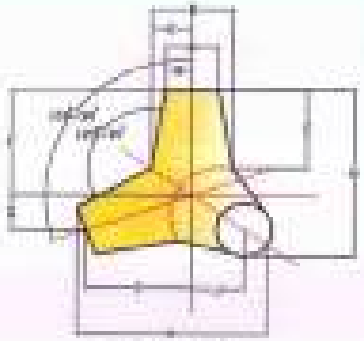
Wt. of Tetrapod	W =	8	T
Density of Concrete	w =	2.4	t/cu. m.
Vol. of Tetrapod	V =	3.333	Cu. meter
Overall dim. of Tetrapod	H =	2.264	meter

Dimensions of Armour Units in meter

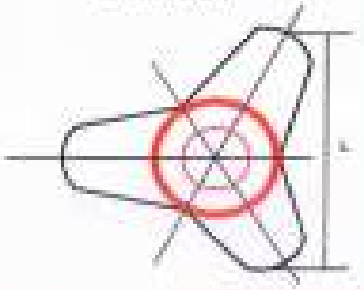
A	0.302*H	0.68
B	0.151*H	0.34
C	0.477*H	1.08
D	0.470*H	1.06
E	0.235*H	0.53
F	0.644*H	1.46
G	0.215*H	0.49
I	0.606*H	1.37
J	0.303*H	0.69
K	1.091*H	2.47
L	1.201*H	2.72



BOTTOM



ELEVATION



Armour layer Thickness (2 Units) = 1.381 * H (Double Layer)
i.e = 3.062 meter

Packing Density (N)

Number Of Tetrapods (Two Layers, Random Placed) Per Unit Area

N = n * KΔ * [1-P/100] * [w/W]**2/3

Where,

Layer coeff.	KΔ =	1.04	constant
Porosity	P=	50	%
No. of Layers	n=	2	nos.

N =	0.485	per sq. m. area
N =	47	per 100 sq. m. area

Specification for 8 t Tetrapod

203647/2025/T HED

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Annexure - V



Photo 1: 90 m long RSWG wave flume facility at CWPRS



Photo 2: Random wave test with H_s = 4.85 m at DWL = +2.60 m



Photo 3: Random wave test with H_s = 4.85 m at DWL = +2.60 m (Endurance Test)

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Photo 4: Random wave test with H_s = 4.0 m at MHHW = +1.40 m



Photo 5: Random wave test with H_s = 3.97 m at MSL = +1.00 m



Photo 6: Random wave test with H_s = 3.76 m at MLLW = +0.40 m

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Photo 7: Regular wave test with H_{10} = 5.0 m at DWL = +2.60 m, t = 10 sec



Photo 8: Regular wave test with H_{10} = 5.12 m at MHHW = +1.40 m, t = 12 sec



Photo 9: Regular wave test with H_{10} = 5.0 m at MHHW = +1.40 m, t = 10 sec

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Photo 10: Regular wave test with $H_{1/3}$ = 5.0 m at MHHW = +1.40 m, t = 8 sec



Photo 11: Regular wave test with $H_{1/3}$ = 5.07 m at MSL = +1.00 m, t = 10 sec



Photo 12: Regular wave test with H_s = 4.80 m at MLLW = +0.40 m, t = 10 sec

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By Speed Post

सत्यमेव जयते

भारत सरकार / Government of India
जल शक्ति मंत्रालय / Ministry of Jal Shakti
जल संसाधन, नदी विकास और गंगा संरक्षण विभाग
Department of Water Resources, River Development and Ganga Rejuvenation
केन्द्रीय जल और विद्युत अनुसंधान शाला
खड़कवासला, पुणे - 411 024
CENTRAL WATER & POWER RESEARCH STATION
Khadakwasla, Pune – 411 024

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✉:mahalingaiah_av@cwprs.gov.in
✉:tayade.br@cwprs.gov.in
🖷:020-24381004
🖳:www.cwprs.gov.in

संख्या/No.: CHS/2024/01/141

दिनांक/Date: 09.08.2024

The Chief Engineer
Harbour Engineering Department
Kamaleswaram, Manacaud,
Thiruvananthapuram
Kerala – 695 009

Sub: Desk & wave flume studies for the design of breakwater for fishery harbor at Ajanur in Kasargod district, Kerala.

Ref: 1) Your letter No. HECE/207/2022-DR8 dated 01.08.2024
2) Discussions at CWPRS on 30.07.2024
3) CWPRS Technical Report No. 6177, November 2023

Sir,

This has a reference to the above cited correspondence regarding the desk & wave flume studies for the design of breakwater for fishery harbor at Ajanur in Kasargod district, Kerala. A request has been made to review the Technical Report (Ref. 3) to optimize the breakwater design. The possibility of optimization of the breakwater cross-sections were discussed during your visit to CWPRS on 30.07.2024. Accordingly, desk studies have been conducted considering the project requirements, and minor modifications to the breakwater cross-sections have been carried out, as shown in Figs. 1 to 4.

The modified design cross-sections of the breakwater include a revised crest width of 5.5 m instead of 7.0 m, except for the roundhead crest width, which remains at 8.0 m. In the modified cross-section for the -2.0 m bed level, the lee side armour consists of 0.5-1.0 t stones placed on a 1:1.5 slope, with a toe-berm consisting of 0.5-1.0 t stones placed at el. +0.2 m, as shown in Fig. 1. In the modified cross-section for the -4.5 m bed level, the lee side armuor consists of 1.0-2.0 t stones placed on a 1:1.5 slope, with a toe-berm consisting of 1.0-2.0 t stones placed at el. -2.55 m, as shown in Fig. 2. Minor modifications have also been made to the toe-berm portion of the roundhead. The toe-berm consists of 3.0-4.0 t

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stones placed at el. -0.7 m, as shown in Fig. 3. The modified plan of the roundhead is shown in Fig. 4. All other details of the breakwater design cross-sections will remain the same as provided in CWPRS Technical Report No. 6177, November 2023.

Hope this would meet with your requirements.

धन्यवाद,

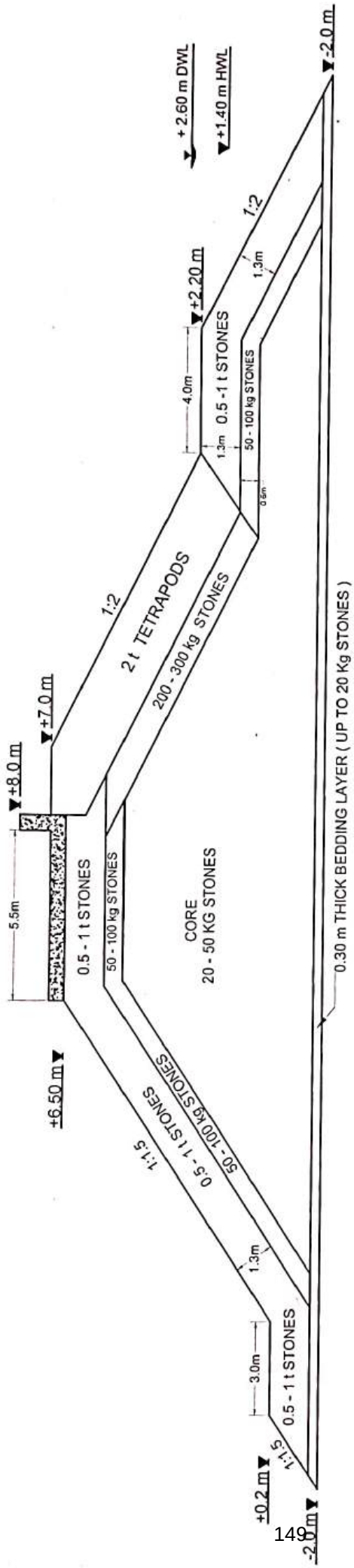
भवदीय,

7/8/2024

(ए वी महालिंगैया/A.V.Mahalingaiah)
वैज्ञानिक 'ई' / Scientist 'E'

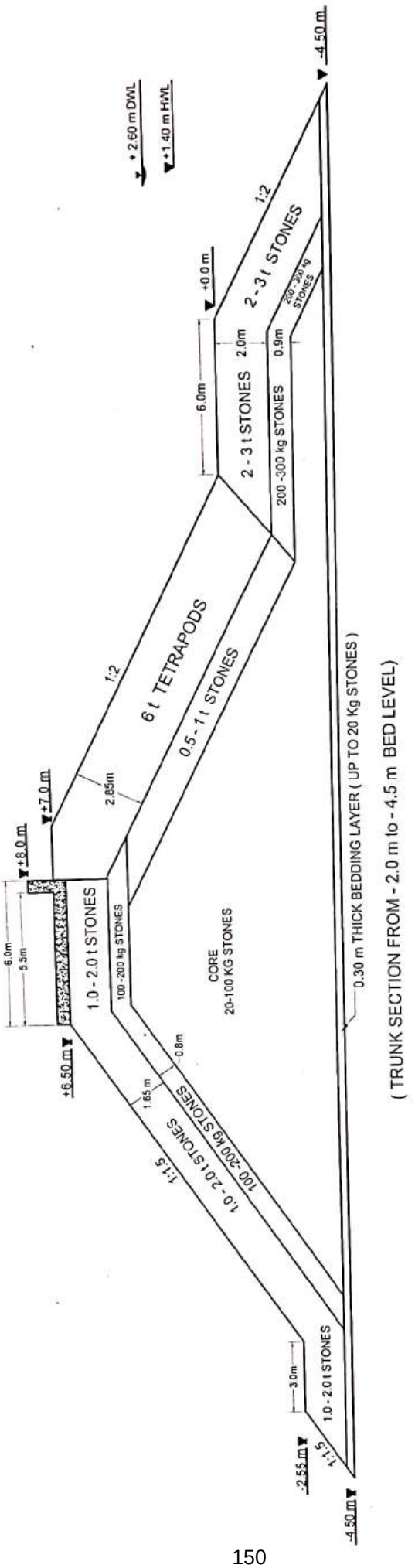
"जल ही जीवन का आधार है।"

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(TRUNK SECTION FROM 0.0 m to - 2.0 m BED LEVEL)

FIG 1 :- MODIFIED DESIGN CROSS -SECTION OF BREAKWATER AT -2.0 m BED LEVEL, AJANUR, KERALA



(TRUNK SECTION FROM - 2.0 m to - 4.5 m BED LEVEL)

FIG 2:- MODIFIED DESIGN CROSS-SECTION OF BREAKWATER AT - 4.50 m BED LEVEL, AJANUR, KERALA

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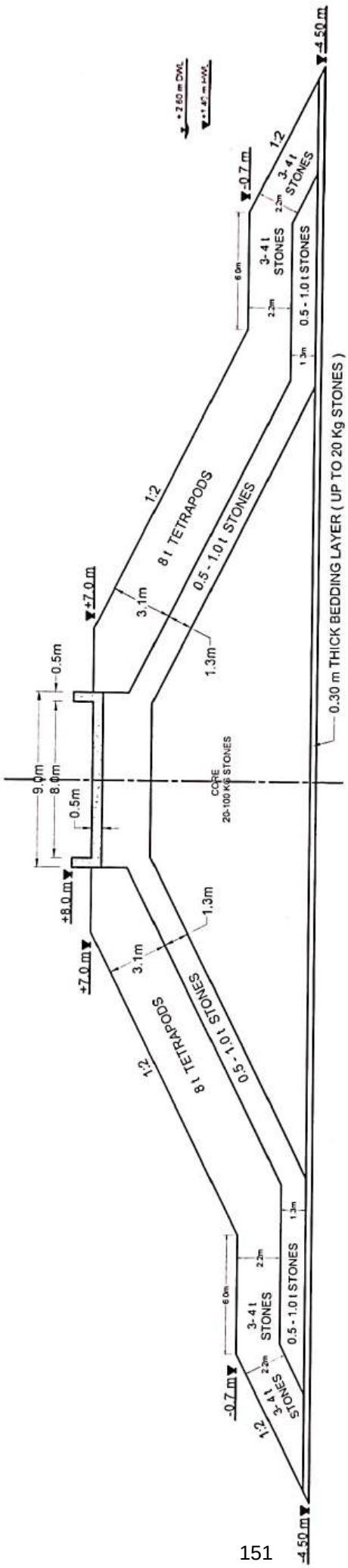


FIG 3 :- MODIFIED ROUNDHEAD CROSS-SECTION OF BREAKWATER AT -4.5 m BED LEVEL, AJANUR, KERALA

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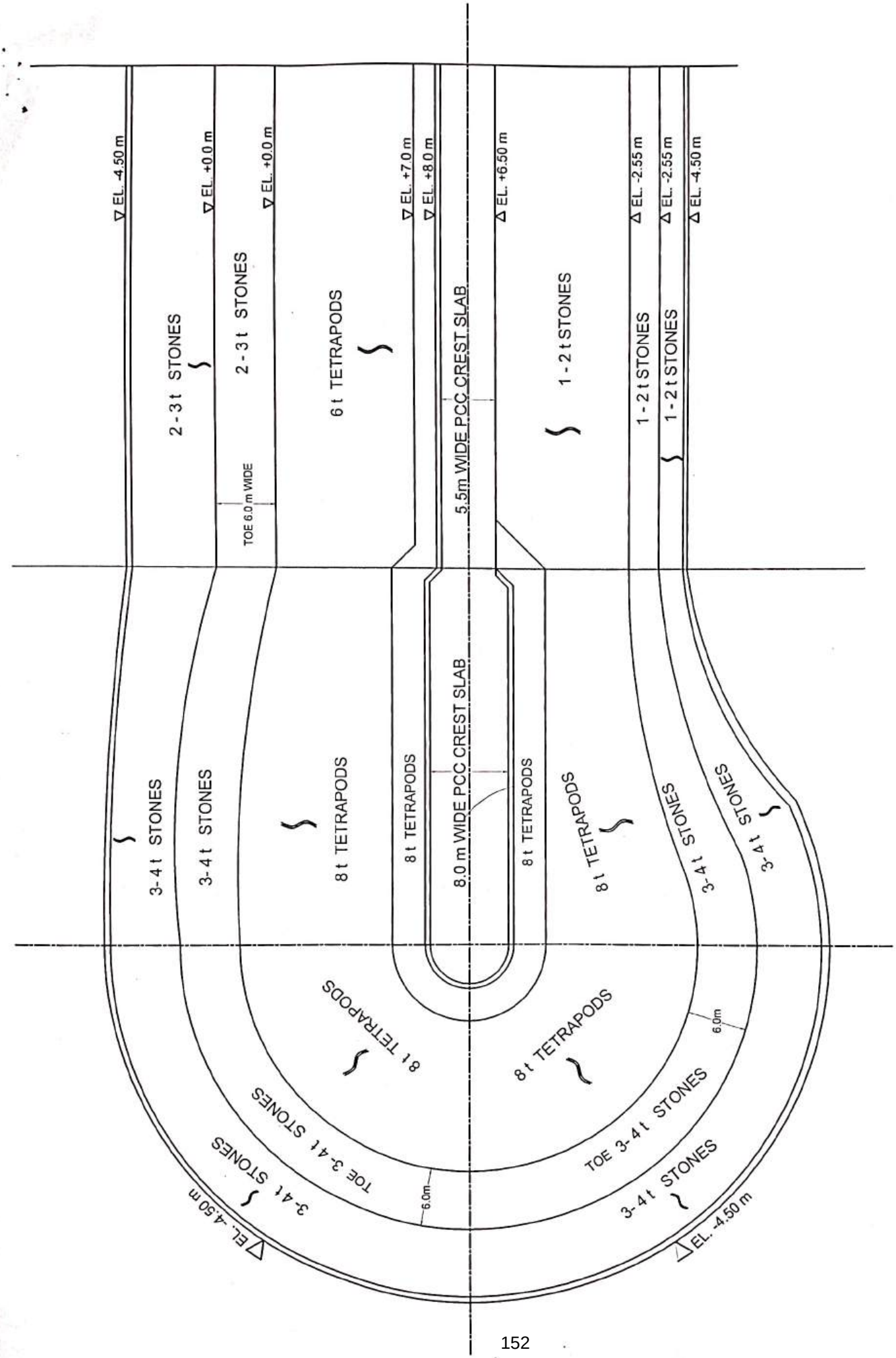


FIG 4 :- PLAN OF ROUNDHEAD SECTION OF BREAKWATER AT -4.5 m BED LEVEL, AJANUR, KERALA

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GENERAL ABSTRACT

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PMMSY - Construction of Ajanur Fishing Harbour - General Abstract				
Sl No	**Item**	**Quantity**	**Unit Rate in Rs**	**Amount in Rs**
1	Construction of Breakwater at Ajanoor	1575m	772063.5	1,21,60,00,000
2	Construction of river training wall and and dredging near the river training area	training wall-435m dredging- 31000 m3		32,60,00,000
3	Dredging And Construction of reclamation Bund	dredging - 132500 m3 reclamation bund- 400 m		6,24,00,000
4	Wharf and Auction Hall	Wharf - 120 m x 6.6 m , Auction Hall - 60 m x 15 m Total 1692m3	34929.1	5,91,00,000
5	Canteen, Rest shed, Locker room, Gear Shed	45 m x 10 m (two Storey)	27666.7	2,49,00,000
6	Compound wall and Side Protection Works	compound wall- 510 m side protection- 1710 m		6,14,00,000
7	Gate and Gate House	2.4 m x 2.4 m ATM and Toll Booth each (area 47.16m2)	38167.9	18,00,000
7	Internal Road, Parking area and Drainage facility	Parking Area - 4320 sqm	3873.6	2,82,00,000
		Internal Road - 740*4 m		
8	Toilet Block	13.3*5	37594.0	25,00,000
9	Construction of approach road to fishing harbour	950 m	14526.3	1,38,00,000
10	Construction of workshop building	9.8*9.8 m	48521.4	46,80,000
11	Construction of office room cum harbour surveillance camera room	14.6*22.6 m (2 storey)	26851.7	89,00,000
12	Construction of wharf for berthing facility	100*5 m	42800.0	2,14,00,000
15	OH Tank and Water Supply Arrangement	As per estimate		1,89,00,000
14	Effluent Treatment Plant	LS		35,00,000
17	Navigational Facility	LS		2,00,000
18	Pressure Washer and Cleaning equipments	LS		6,00,000
19	Landscaping, Green Belt and Rainwater Harvesting	LS		20,00,000
24	Mechanical conveyor system & Automation	LS		1,50,00,000
23	Electrification and Installation of Solar energy system	LS		2,50,00,000
			Total (A)	**1,89,62,80,000**

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Smart Infrastructure and automated systems			
30	Smart Technology Investments		
30.1	Procurement and installation of smart infrastructure components, such as IoT devices, sensors, communication networks, and data management systems including cost of hardware, software, and installation services.	LS	1,00,00,000
30.2	Development or customization of software for data management, analysis and visualization	LS	50,00,000
31	Communication and Connectivity		
31.1	Deployment of communication infrastructure, including internet connectivity, satellite communication systems, and wireless networks	LS	50,00,000
31.2	Implementation of networking equipment and cybersecurity measures	LS	50,00,000
32	Safety and Security Measures		
32.1	Investment in safety equipment (distress beacons and rescue drones)	LS	50,00,000
32.2	Installation of surveillance system including CCTV camera	LS	50,00,000
35	Provide charging stations for electric vehicles	L.S	10,00,000
36	Vehilce for installing IOT devices	L.S	35,00,000
		Sub total	**3,95,00,000**
		GST @ 18%	**71,10,000**
		Sub Total including GST @ 18% (B)	**4,66,10,000**
		Sub Total (C= A+B)	**1,94,28,90,000**
		Contingencies @ 3%	**5,71,10,000**
		Grand Total	**2,00,00,00,000**
Rupees Two hundred crore only			

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ESTIMATES

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EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of Breakwater-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Appendix A- North Breakwater- 1150m**			
1.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	8500.000cum	@210.02/cum	1785170.00
1.002	OD7023/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	33200.000tonne	@935.64/tonne	31063248.00
1.003	OD4410/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	27300.000tonne	@935.64/tonne	25542972.00

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EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
1.004	OD4413/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20kg to 100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	237600.000tonne	@935.64/tonne	222308064.00
1.005	OD7021/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	47400.089tonne	@935.64/tonne	44349419.27
1.006	OD7020/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	9500.018tonne	@935.64/tonne	8888596.84
1.007	OD7018/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	22600.043tonne	@1093.96/tonne	24723543.04
1.008	OD7017/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 0.5-1T and above category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	49000.087tonne	@1077.91/tonne	52817683.78
1.009	OD235/2022-2023			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1 T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings			

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site			
	Net Total	69100.130tonne	@1077.91/tonne	74483721.13
1.010	OD7158/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T - 3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	51000.088tonne	@1077.91/tonne	54973504.86
1.011	65.103			
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .			
	Net Total	3100.000each	@7537.42/each	23366002.00
1.012	65.104			
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site			
	Net Total	3100.000each	@909.34/each	2818954.00
1.013	OD7266/2023-2024			
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate			

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer			
	Net Total	7500.000each	@22383.48/each	167876100.00
1.014	OD7610/2023-2024			
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete			
	Net Total	7500.000each	@1556.05/each	11670375.00
1.015	65.124			
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.			
	Net Total	370.000each	@29749.73/each	11007400.10
1.016	65.125			
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete			
	Net Total	370.000each	@2214.51/each	819368.70
			Heading Total(Rs)	758494122.72
2	**Appendix B - Southern Breakwater- 425m**			
2.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	4300.000cum	@210.02/cum	903086.00

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
2.002	OD7147/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	12500.000tonne	@935.64/tonne	11695500.00
2.003	OD7146/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	45100.000tonne	@935.64/tonne	42197364.00
2.004	OD7145/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	56000.000tonne	@935.64/tonne	52395840.00
2.005	OD7144/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	9000.000tonne	@935.64/tonne	8420760.00
2.006	OD7143/2023-2024			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10 kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	6500.000tonne	@935.64/tonne	6081660.00
2.007	OD7142/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once			

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	8600.000tonne	@1093.96/tonne	9408056.00
2.008	OD7141/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 500 Kg -1T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	26600.000tonne	@1077.91/tonne	28672406.00
2.009	OD241/2022-2023			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site			
	Net Total	16400.000tonne	@1077.91/tonne	17677724.00
2.010	OD7159/2023-2024			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T-3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with			

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	15300.000tonne	@1077.91/tonne	16492023.00
2.011	65.103			
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .			
	Net Total	2950.000each	@7537.42/each	22235389.00
2.012	65.104			
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site			
	Net Total	2950.000each	@909.34/each	2682553.00
2.013	OD7279/2023-2024			
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer			
	Net Total	1750.000each	@22383.48/each	39171090.00
2.014	OD7611/2023-2024			
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc			

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	complete			
	Net Total	1750.000each	@1556.05/each	2723087.50
2.015	65.124			
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.			
	Net Total	350.000each	@29749.73/each	10412405.50
2.016	65.125			
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete			
	Net Total	350.000each	@2214.51/each	775078.50
	Heading Total(Rs)			271944022.50
	Total Estimation PAC			1030438145.22
4	**Extra Charges**			
3.001	Provision for GST			
	1030438145.22		18.00%	185478866.14
	Grand Total			1215917011.36
	Round off			82988.64
	Rounded Total(Rs)			1216000000.00
	Rupees One Hundred Twenty One Crore Sixty Lakh			

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of Breakwater-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Appendix A- North Breakwater- 1150m						
1.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	Break water on the land connection area						
		1.000	100.000	50.000	(1.2+2.2)/2		8500.000
	Total						**8500.000**
						Total Quantity in cum	**8500.000**
1.002	OD7023/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	Upto 20kg stones						
	Ch 0 to 210	1.000	210.000	(13.84+14.89)/2	(2/3)*2.65		5329.425
	Ch 210 to 1150	1.000	940.000	(15.24+16.81)/2	(2/3)*2.65		26612.234
	Head portion as per calculation sheet	1.000	628.540		(2/3)*2.65		1110.423
	Rounding	1.000	147.918				147.918
	Total						**33200.000**
						Total Quantity in tonne	**33200.000**

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EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.003	OD4410/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	10 to 200 Kg stones						
	Ch 210 to 1150	1.000	940.000	(15.26+17.42)/2	2/3*2.65		27135.345
	Rounding	1.000	164.655				164.655
	Total						**27300.000**
						Total Quantity in tonne	**27300.000**
1.004	OD4413/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20kg to 100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20 to 100 Kg stones						
	Ch 210 to 1150	1.000	940.000	(117.95+163.28)/2	2/3*2.65		233515.084
	Head portion as per calculation sheet	1.000	2198.950		2/3*2.65		3884.819
	Rounding	1.000	200.097				200.097
	Total						**237600.000**

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in tonne	**237600.000**
1.005	OD7021/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20-50kg stones						
	Ch 0 to 210	1.000	210.000	(112.86+141.63)/2	(2/3)*2.65		47207.984
	Rounding	1.000	192.105				192.105
	Total						**47400.089**
						Total Quantity in tonne	**47400.089**
1.006	OD7020/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	50-100kg stones						
	Ch 0 to 210	1.000	210.000	(24.19+25.99)/2	(2/3)*2.65		9308.408
	Rounding	1.000	191.610				191.610
	Total						**9500.018**
						Total Quantity in tonne	**9500.018**

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.007	OD7018/2023-2024						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	200- 300kg stones						
	Ch 0 to 210	1.000	210.000	(10.29+12.52)/2	(2/3)*2.65		4231.263
	Ch 210 to 1150	1.000	940.000	(11.03+11.03)/2	(2/3)*2.65		18317.188
	Rounding	1.000	51.592				51.592
	Total						**22600.043**
						Total Quantity in tonne	**22600.043**
1.008	OD7017/2023-2024						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 0.5-1T and above category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	500 Kg to 1T Stones						
	Ch 0 to 210	1.000	210.000	(47.5+49.84)/2	(2/3)*2.65		18056.604

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Ch 210 to 1150	1.000	940.000	(14.45+18.89)/2	(2/3)*2.65		27683.366
	Head portion as per calculation sheet	1.000	1790.050		(2/3)*2.65		3162.428
	Rounding	1.000	97.689				97.689
	Total						**49000.087**
						Total Quantity in tonne	**49000.087**
1.009	OD235/2022-2023						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1 T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site						
	1T to 2T Stones						
	Ch 210 to 1150	1.000	940.000	(39.35+43.81)/2	(2/3)*2.65		69050.650
	Rounding	1.000	49.480				49.480
	Total						**69100.130**
						Total Quantity in tonne	**69100.130**
1.010	OD7158/2023-2024						

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EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T - 3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	2T - 3T Stones						
	Ch 300 to 1150	1.000	940.000	(28.21+28.21)/2	(2/3)*2.65		46847.495
	Head portion as per calculation sheet	1.000	2294.810		(2/3)*2.65		4054.172
	Rounding	1.000	98.421				98.421
	Total						**51000.088**
						Total Quantity in tonne	**51000.088**
1.011	65.103						
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .						
	Moulding & supplying 2T						
	Ch 0 to 210	1.000	210.000	(11.07+13.3)/2		1.196000	3060.385
	Rounding	1.000	39.615	1.000	1.000	1.000000	39.615
	Total						**3100.000**
						Total Quantity in each	**3100.000**
1.012	65.104						

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(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site						
	Conveying 2T tetrapod						
	Quantity as per item 11	1.000	3100.000				3100.000
	Total						**3100.000**
						Total Quantity in each	**3100.000**
1.013	OD7266/2023-2024						
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer						
	Moulding & supplying 6 T						
	Ch 210 to 1150	1.000	940.000	(12+15.31)/2		0.580000	7444.706
	Rounding	1.000	55.294			1.000000	55.294
	Total						**7500.000**
						Total Quantity in each	**7500.000**
1.014	OD7610/2023-2024						
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	Conveying 6T tetrapod						
	Quantity as per item 13	1.000	7500.000				7500.000
	Total						**7500.000**
						Total Quantity in each	**7500.000**
1.015	65.124						

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EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.						
	Moulding & Supplying 8T Tetrapods						
	Round head	1.000	3.14*12.9	18.780		0.480000	365.137
	Rounding	1.000	4.863				4.863
	Total						**370.000**
						Total Quantity in each	**370.000**
1.016	65.125						
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	Conveying 8T tetrapod						
	Quantity as per item 15	1.000	370.000				370.000
	Total						**370.000**
						Total Quantity in each	**370.000**
2	Appendix B - Southern Breakwater- 425m						
2.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	Break water on the land connection area						
		1.000	50.000	50.000	(1.2+2.2)/2		4250.000
	rounding	1.000	50.000				50.000
	Total						**4300.000**
						Total Quantity in cum	**4300.000**
2.002	OD7147/2023-2024						

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EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	Up to 20 Kg stones						
	Ch 0 to 200	1.000	200.000	(13.84+14.89)/2	(2/3)*2.65		5075.643
	Ch 200 to 425	1.000	225.000	(15.24+16.29)/2	(2/3)*2.65		6266.599
	Head portion as per calculation sheet	1.000	594.600		(2/3)*2.65		1050.462
	Rounding	1.000	107.296	1.000	1.000		107.296
	Total						**12500.000**
						Total Quantity in tonne	**12500.000**
2.003	OD7146/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20 Kg - 50 Kg stones						
	Ch 0 to 200	1.000	200.000	(112.86+141.63)/2	(2/3)*2.65		44959.985
	rounding	1.000	140.015	1.000	1.000		140.015

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(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**45100.000**
						Total Quantity in tonne	**45100.000**
2.004	OD7145/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20-100kg stones						
	Ch 200 to 425	1.000	225.000	(117.95+146.87)/2	(2/3)*2.65		52633.074
	head portion as per calculation	1.000	1888.330		(2/3)*2.65		3336.056
	rounding	1.000	30.870				30.870
	Total						**56000.000**
						Total Quantity in tonne	**56000.000**
2.005	OD7144/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	50Kg - 100kg stones						
	Ch 0 to 200	1.000	200.000	(24.19+25.99)/2	(2/3)*2.65		8865.150

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	134.850				134.850
	Total						**9000.000**
						Total Quantity in tonne	**9000.000**
2.006	OD7143/2023-2024						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10 kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	100-200kg stones						
	Ch 200 to 425	1.000	225.000	(15.26+16.7)/2	(2/3)*2.65		6352.062
	Rounding	1.000	147.938				147.938
	Total						**6500.000**
						Total Quantity in tonne	**6500.000**
2.007	OD7142/2023-2024						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	200Kg - 300 Kg stones						
	Ch 0 to 200	1.000	200.000	(10.29+12.52)/2	(2/3)*2.65		4029.774
	Ch 200 to 425	1.000	225.000	(11.03+11.03)/2	(2/3)*2.65		4384.433

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(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	185.793				185.793
	Total						**8600.000**
						Total Quantity in tonne	**8600.000**
2.008	OD7141/2023-2024						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 500 Kg -1T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	500 Kg -1T Stones						
	Ch 0 to 200	1.000	200.000	(47.5+49.84)/2	(2/3)*2.65		17196.766
	Ch 200 to 425	1.000	225.000	(14.45+17.44)/2	(2/3)*2.65		6338.149
	head portion as per calculation	1.000	1667.380		(2/3)*2.65		2945.710
	rounding	1.000	119.375				119.375
	Total						**26600.000**
						Total Quantity in tonne	**26600.000**
2.009	OD241/2022-2023						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site						

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	1T-2T Stones						
	Ch 200 to 425	1.000	225.000	(39.35+42.32)/2	(2/3)*2.65		16231.943
	Rounding	1.000	168.057				168.057
	Total						**16400.000**
						Total Quantity in tonne	**16400.000**
2.010	OD7159/2023-2024						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T-3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	2-3T Stones						
	Ch 200 to 425	1.000	225.000	(28.21+28.21)/2	(2/3)*2.65		11213.496
	Head portion as per calculation sheet	1.000	2213.980		(2/3)*2.65		3911.372
	rounding	1.000	175.132				175.132
	Total						**15300.000**
						Total Quantity in tonne	**15300.000**
2.011	65.103						
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .						

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Moulding & supplying 2T						
	Ch 0 to 200	1.000	200.000	(11.07+13.3)/2		1.196000	2914.652
	Rounding	1.000	35.348	1.000		1.000000	35.348
	Total						**2950.000**
						Total Quantity in each	**2950.000**
2.012	65.104						
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site						
	Conveying 2T tetrapod						
	Quantity as per item 11	1.000	2950.000				2950.000
	Total						**2950.000**
						Total Quantity in each	**2950.000**
2.013	OD7279/2023-2024						
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer						
	Moulding & supplying 6T						
	Ch 200 to 425	1.000	225.000	(12+14.2)/2		0.580000	1709.550
	Ch 350 to 435	1.000	40.450				40.450
	Total						**1750.000**
						Total Quantity in each	**1750.000**
2.014	OD7611/2023-2024						
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	conveying 6T tetrapod						
	Quantity as per item 13	1.000	1750.000				1750.000
	Total						**1750.000**
						Total Quantity in each	**1750.000**

EST No. :HED/CEHED/EST/105/2022_5_1_1 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
2.015	65.124						
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.						
	Moulding & supplying 8T						
	Round head	1.000	3.14*12.4	17.660		0.480000	330.053
	rounding	1.000	19.947	1.000	1.000	1.000000	19.947
	Total						**350.000**
						Total Quantity in each	**350.000**
2.016	65.125						
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	conveying 8T tetrapod						
	Quantity as per item 15	1.000	350.000				350.000
	Total						**350.000**
						Total Quantity in each	**350.000**

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of River training work and Dredging near the river training area-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Appendix A -River training work-435m**			
1.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	4250.000cum	@210.02/cum	892585.00
1.002	OD5423/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	12550.022tonne	@935.64/tonne	11742302.58
1.003	OD5426/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	58500.110tonne	@935.64/tonne	54735042.92

File No. HECE/207/2022-DR8 (Computer No. 19397)

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EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
1.004	OD5425/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20kg to 100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	44300.078tonne	@935.64/tonne	41448924.98
1.005	OD5427/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	11600.022tonne	@935.64/tonne	10853444.58
1.006	OD5428/2024-2025			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges			

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	8700.017tonne	@1093.96/tonne	9517470.60
1.007	OD5424/2024-2025			
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District			
	Net Total	5000.000tonne	@935.64/tonne	4678200.00
1.008	OD5429/2024-2025			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 0.5-1T and above category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	30300.052tonne	@1077.91/tonne	32660729.05
1.009	OD5430/2024-2025			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1 T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings			

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site			
	Net Total	12700.024tonne	@1077.91/tonne	13689482.87
1.010	OD5431/2024-2025			
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T - 3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District			
	Net Total	12700.016tonne	@1077.91/tonne	13689474.25
1.011	65.103			
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .			
	Net Total	3800.000each	@7537.42/each	28642196.00
1.012	65.104			
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site			
	Net Total	3800.000each	@909.34/each	3455492.00
1.013	OD5432/2024-2025			
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate			

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer			
	Net Total	1350.000each	@22383.48/each	30217698.00
1.014	OD5433/2024-2025			
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete			
	Net Total	1350.000each	@1556.05/each	2100667.50
1.015	65.124			
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.			
	Net Total	350.000each	@29749.73/each	10412405.50
1.016	65.125			
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete			
	Net Total	350.000each	@2214.51/each	775078.50
			Heading Total(Rs)	269511194.33
2	**Appendix B- Dredging near river training area**			
2.001	65.82			
	Deepening the harbour basin and mouth by using dredger having a flow rate of 700 to 1000m3 slurry per hour with a solid output of not less than 127.5 m3/hour and dumping the spoil at location already pointed out by the departmental officers with a lead up to a radial distance of 500m, including hire charges of dredger, all tools and plants and accesories , fuel charges, idling and mobilisation charges, providing and shifting the pipe lines including all labour charges, incidental charges etc. and drtvice			

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	taxes complete for a depth upto (-) 4.50m bedlevel with a tolerance of +/- 20cm. Unexpected Error occured Please Login again!! Click here to Login			
	Net Total	31000.000cum	@182.57/cum	5659670.00
			Heading Total(Rs)	5659670.00
			Total Estimation PAC	275170864.33
Sl No	**Description**		**Percentage/LS**	**Amount**
3	**Lumsum Heading**			
3.001	LS provision for part TS			
		null	null%	500000.00
			Total Lumsum Amount	500000.00
4	**Extra Charges**			
3.001	Provision for GST			
		275170864.33	18.00%	49530755.58
			Grand Total	325201619.91
			Round off	798380.09
			Rounded Total(Rs)	326000000.00
	Rupees Thirty Two Crore Sixty Lakh			

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of River training work and Dredging near the river training area-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Appendix A -River training work-435m						
1.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	River Training work						
		1.000	50.000	50.000	(1.2+2.2)/2		4250.000
	Total						**4250.000**
						Total Quantity in cum	**4250.000**
1.002	OD5423/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into upto 20kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	Upto 20 kg stones						
	Ch 0 to 260	1.000	260.000	(13.84+14.89)/2	2/3*2.65		6598.336
	Ch 260 to 435	1.000	175.000	(15.24+16.29)/2	2/3*2.65		4874.022
	Head As per calculation sheet	1.000	594.600		2/3*2.65		1050.462
	Rounding	1.000	27.202				27.202
	Total						**12550.022**
						Total Quantity in tonne	**12550.022**

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.003	OD5426/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20-50kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20 - 50 kg stones						
	Ch 0 to 260	1.000	260.000	(112.86+ 141.63)/2	2/3*2.65		58447.980
	Rounding	1.000	52.130				52.130
	Total						**58500.110**
						Total Quantity in tonne	**58500.110**
1.004	OD5425/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 20kg to 100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	20 to 100 Kg Stones						
	Ch 260 to 435	1.000	175.000	(117.95+ 146.87)/2	2/3*2.65		40936.836
	Head portion as per calculation sheet	1.000	1888.330		2/3*2.65		3336.056
	Rounding	1.000	27.186				27.186
	Total						**44300.078**

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in tonne	**44300.078**
1.005	OD5427/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 50-100kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	50 to 100 Kg						
	Ch 0 to 260	1.000	260.000	(24.19+25.99)/2	2/3*2.65		11524.695
	Rounding	1.000	75.327				75.327
	Total						**11600.022**
						Total Quantity in tonne	**11600.022**
1.006	OD5428/2024-2025						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 200kg to 300kg category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the secondary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the secondary armour and berm of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	200 to 300 Kg stones						
	Ch 0 to 260	1.000	260.000	(10.29+12.52)/2	2/3*2.65		5238.707
	Ch 260 to 435	1.000	175.000	(11.03+11.03)/2	2/3*2.65		3410.115

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Rounding	1.000	51.195				51.195
	Total						**8700.017**
						Total Quantity in tonne	**8700.017**
1.007	OD5424/2024-2025						
	Supplying blasted rock from approved quarry to sorting site by lorry/ tipper, and sorting the stones into 10kg to 200kg category stones of approved quality having specific gravity ranging from 2.65 to 2.8 for forming the core of rubble mound breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and measurements of categorized stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and rehandling and forming the core of the break water to the lines and levels as per the approved drawings and inspecting the profile once in a week with tolerance of +/- 20cm in final levels including all cost and labour charges, hire and operational charges of light crane and cost of spalls/ quarry muck and labour for forming the roadway for movement of lorries/ tippers / cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasaragode District						
	10- 200 kg Stone						
	Ch 260 to 435	1.000	175.000	(15.26+16.7)/2	2/3*2.65		4940.493
	Rounding	1.000	59.507				59.507
	Total						**5000.000**
						Total Quantity in tonne	**5000.000**
1.008	OD5429/2024-2025						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 0.5-1T and above category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						
	500 to 1 T						
	Ch 0 to 260	1.000	260.000	(47.5+49.84)/2	2/3*2.65		22355.796
	Ch 260 to 435	1.000	175.000	(14.45+17.44)/2	2/3*2.65		4929.672

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Head As per calculation sheet	1.000	1667.380		2/3*2.65		2945.710
	Rounding	1.000	68.874				68.874
	Total						**30300.052**
						Total Quantity in tonne	**30300.052**
1.009	OD5430/2024-2025						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 1 T to 2 T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site						
	1 T to 2 T						
	Ch 260 to 435	1.000	175.000	(39.35+42.32)/2	2/3*2.65		12624.845
	Rounding	1.000	75.179				75.179
	Total						**12700.024**
						Total Quantity in tonne	**12700.024**
1.010	OD5431/2024-2025						
	Supplying blasted rock from approved quarry to sorting site and sorting the stones into 2T - 3T category stones of approved quality having specific gravity ranges from 2.65 to 2.8 for forming the primary armour and berm of rubble mount breakwater inclusive of cost of stones, hire of lorries and machineries, labour charges required at quarry and at sorting place and the measurements of catagorised stones after proper sorting are taken on weigh bridge installed at site at the cost of the contractor with approved software having printouts using contractors supplied papers, stationeries and conveyed to the approved alignment of the breakwater and forming the primary armour of the breakwater to the lines and levels as per approved drawings with tolerance of +/- 20 cm in final levels including all cost and labour charges, hire and operational charges of mobile crane and excavator, rehandling, placing and packing and using mobile crane, inspecting the profile once in a week and cost of spalls/quarry muck and hire of machineries for forming the roadway for movement of lorries/tippers/cranes etc including all incidental charges etc complete as per the direction of departmental officers at site Kasargode District						

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	2 T to 3 T						
	Ch 260 to 435	1.000	175.000	(28.21+28.21)/2	2/3*2.65		8721.608
	Head as per calculation sheet	1.000	2213.980		2/3*2.65		3911.372
	Rounding	1.000	67.036				67.036
	Total						**12700.016**
						Total Quantity in tonne	**12700.016**
1.011	65.103						
	Moulding and supplying 0.8 cum(2T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40mm to 20mm and 30% 20mm to 6mm using 380kg cement/ m3 of concrete as per approved mix design of mix proportion 0.5:1:1. 46:3.22 by weight of water cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @7 day - 20 N/mm2 (ii) @ 28 day - 30 N/mm2 and minimum density of concrete 2.5 g/cc including hire and operational charges of tools and plants, mould, curing, rehandling and stacking charges etc., complete as per the instruction of departmental officers at site .						
	Moulding & Supplying 2T						
	Ch 0 to 260	1.000	260.000	(11.07+13.3)/2		1.196000	3789.048
	Rounding	1.000	10.952				10.952
	Total						**3800.000**
						Total Quantity in each	**3800.000**
1.012	65.104						
	Conveying 0.8cum (2T) tetrapod from stacking yard and placing in position in two layers according to specification and forming the armour layer of breakwater to lines and levels over the secondary armour layer including hire and operational charges of tools and plants etc., complete as per the direction of the departmental officers at site						
	Conveying 2T tetrapod						
	Quantity as per item 11	1.000	3800.000				3800.000
	Total						**3800.000**
						Total Quantity in each	**3800.000**
1.013	OD5432/2024-2025						

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Moulding and supplying cement concrete 2.4m3 (6T) tetrapod with graded aggregate of 40% 75mm to 40 mm, 30% 40 to 20mm, 30% 20 to 5mm using 380 kg cement /m3 pf cpmcrete as per approved mix design of mix proportion 0.5:,1.46:3.22 by weight of water cement, fine aggregate, course aggregate (specific gravity of fine aggregate and course aggregate should not be less than 2.73 and 2.5 respectively) and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5 g/cc. including hire and operational charge of tools and plants moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer						
	Moulding & supplying 6 T						
	Ch 260 to 435	1.000	175.000	(12+14.2) /2		0.580000	1329.650
	Rounding	1.000	20.350				20.350
	Total						**1350.000**
						Total Quantity in each	**1350.000**
1.014	OD5433/2024-2025						
	Conveying 2.4 m3 (6T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	Conveying 6T tetrapod						
	Quantity as per item 13	1.000	1350.000				1350.000
	Total						**1350.000**
						Total Quantity in each	**1350.000**
1.015	65.124						
	Moulding and supplying cement concrete 3.2 m3 (8T) tetrapod with graded aggregate of 40% 75mm to 40mm, 30% 40 to 20mm, 30% 20 to 5 mm using 380 kg cement /m3 of concrete as per approved mix design of mix proportion 0.5:1:1.46:3.22 by weight of water, cement, fine aggregate, coarse aggregate (specific gravity of fine aggregate and coarse aggregate should not be less than 2.73 and 2.5 respectively and the cement shall be 43 grade or higher) minimum cube strength requirement (i) @ 7 day - 20N/mm2 (ii) @ 28 day - 30N/mm2 and minimum density of concrete 2.5g/cc. including hire and operational charge of tools and plants, moulding and rehandling and stacking charge etc complete according to specification and instructions of Engineer.						
	Moulding & Supplying 8T Tetrapods						
	Round Head	1.000	3.14*12.4	17.660		0.480000	330.053
	Rounding	1.000	19.947				19.947
	Total						**350.000**
						Total Quantity in each	**350.000**
1.016	65.125						

EST No. :HED/CEHED/EST/105/2022_5_16_15 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Conveying 3.2 m3 (8T) tetrapods from stacking and placing in two layer according to specification and forming the armour layer of break water to lines and levels at depth of water 8m and above including hire and operational charges of tools and plants etc complete						
	Conveying 8T tetrapod						
	Quantity as per item 15	1.000	350.000				350.000
	Total						**350.000**
						Total Quantity in each	**350.000**
2	Appendix B- Dredging near river training area						
2.001	65.82						
	Deepening the harbour basin and mouth by using dredger having a flow rate of 700 to 1000m3 slurry per hour with a solid output of not less than 127.5 m3/hour and dumping the spoil at location already pointed out by the departmental officers with a lead up to a radial distance of 500m, including hire charges of dredger, all tools and plants and accesories , fuel charges, idling and mobilisation charges, providing and shifting the pipe lines including all labour charges, incidental charges etc. and drtvice taxes complete for a depth upto (-) 4.50m bedlevel with a tolerance of +/- 20cm. Unexpected Error occured Please Login again!! Click here to Login						
	Deepening and Dredging						
	Area between 0 and -1	1.000	7745.080		(3+2)/2		19362.700
	Area between -1 and -2	1.000	5106.141		(2+1)/2		7659.212
	Area between -2 and -3	1.000	7871.094		(1+0)/2		3935.547
	Rounding	1.000	42.541				42.541
	Total						**31000.000**
						Total Quantity in cum	**31000.000**

EST No. :HED/CEHED/EST/105/2022_5_2_1 (Edit Id : 13)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Dredging And Construction of reclamation Bund-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Dredging**			
1.001	60.7.1			
	DRY RUBBLE MASONRY _ Dry rubble without concrete levelling course masonry with good quality blasted rubble including packing to compactness to lines and levels cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site			
	Net Total	5720.000cum	@3426.06/cum	19597063.20
1.002	OD204/2022-2023			
	Supplying and laying Geotextile (120 grams per sqm membrane) in two layers including joints by stitching, over lapping etc. over sand bag to the land side of the bund including all cost of materials and labour charges etc. complete as per the directions of the departmental officers at site.			
	Net Total	2200.000sqm	@85.11/sqm	187242.00
1.003	65.82			
	Deepening the harbour basin and mouth by using dredger having a flow rate of 700 to 1000m3 slurry per hour with a solid output of not less than 127.5 m3/hour and dumping the spoil at location already pointed out by the departmental officers with a lead up to a radial distance of 500m, including hire charges of dredger, all tools and plants and accesories , fuel charges, idling and mobilisation charges, providing and shifting the pipe lines including all labour charges, incidental charges etc. and drtvice taxes complete for a depth upto (-) 4.50m bedlevel with a tolerance of +/- 20cm. Unexpected Error occured Please Login again!! Click here to Login			
	Net Total	132500.000cum	@182.57/cum	24190525.00
1.004	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	55.526cum	@9237.20/cum	512904.77
1.005	OD5553/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR			

EST No. :HED/CEHED/EST/105/2022_5_2_1 (Edit Id : 13)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	4159.320kilogram	@96.62/kilogram	401873.50
			Heading Total(Rs)	44889608.47
2	**Reclamation bund**			
2.001	11.1.5			
	Excavation for Structures Earthwork in excavation for structures as per drawing and technical specifications Clause 305.1 including setting out, construction of shoring and bracing, removal of stumps and other deleterious material and disposal upto a lead of 50 m, dressing of sides and bottom and backfilling in trenches with excavated suitable material. V. Marshy soil			
	Net Total	4800.000cum	@1407.08/cum	6753984.00
2.002	12.11			
	Providing and laying filter media with granular crushed aggregates as per specification to a thickness of not less than 600 mm with smaller size towards the soil and bigger size towards the wall and providing over the entire surface behind abutment, wing wall, return wall to the full height, compacted to firm condition complete as per drawing and technical specification Clause 1204.3.8			
	Net Total	360.000cum	@3435.35/cum	1236726.00
			Heading Total(Rs)	7990710.00
			Total Estimation PAC	52880318.47
4	**Extra Charges**			
3.001	Provision for GST			
	52880318.47		18.00%	9518457.32
			Grand Total	62398775.79
			Round off	1224.21
			Rounded Total(Rs)	62400000.00
	Rupees Six Crore Twenty Four Lakh			

EST No. :HED/CEHED/EST/105/2022_5_2_1 (Edit Id : 13)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Dredging And Construction of reclamation Bund-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Dredging						
1.001	60.7.1						
	DRY RUBBLE MASONRY _ Dry rubble without concrete levelling course masonry with good quality blasted rubble including packing to compactness to lines and levels cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site						
	DR						
	protection wall along the basin	1.000	400.000	(4+1.2)/2	5.500		5720.000
	Total						**5720.000**
						Total Quantity in cum	**5720.000**
1.002	OD204/2022-2023						
	Supplying and laying Geotextile (120 grams per sqm membrane) in two layers including joints by stitching, over lapping etc. over sand bag to the land side of the bund including all cost of materials and labour charges etc. complete as per the directions of the departmental officers at site.						
	geotextile						
	protection wall along the basin	1.000	400.000		5.500		2200.000
	Total						**2200.000**
						Total Quantity in sqm	**2200.000**
1.003	65.82						
	Deepening the harbour basin and mouth by using dredger having a flow rate of 700 to 1000m3 slurry per hour with a solid output of not less than 127.5 m3/hour and dumping the spoil at location already pointed out by the departmental officers with a lead up to a radial distance of 500m, including hire charges of dredger, all tools and plants and accesories , fuel charges, idling and mobilisation charges, providing and shifting the pipe lines including all labour charges, incidental charges etc. and drtvice taxes complete for a depth upto (-) 4.50m bedlevel with a tolerance of +/- 20cm. Unexpected Error occured Please Login again!! Click here to Login						
	Deepening and Dredging						
	Area between 0 and -1	1.000	30265.610		(3+2)/2		75664.025
	Area between -1 and -2	1.000	25704.216		(2+1)/2		38556.324
	Area between -2 and -3	1.000	36368.372		(1+0)/2		18184.186

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EST No. :HED/CEHED/EST/105/2022_5_2_1 (Edit Id : 13)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Rounding	1.000	95.465				95.465
	Total						**132500.000**
						Total Quantity in cum	**132500.000**
1.004	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	belt and guard stone works						
	rcc belt along basin	1.000	400.000	1.150	0.100		46.000
	guard stones along basin; 2m c/c	201.000	0.200	0.200	0.600	1.000000	4.824
	Rounding	4.702	1.000	1.000	1.000	1.000000	4.702
	Total						**55.526**
						Total Quantity in cum	**55.526**
1.005	OD5553/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR						
	Steel						
	rcc belt along basin	1.000	400.000	1.150	0.100	80.000000	3680.000
	guard stones along basin; 2m c/c	201.000	0.200	0.200	0.600	80.000000	385.920
	Rounding	0.934	1.000	1.000	1.000	100.000000	93.400
	Total						**4159.320**
						Total Quantity in kilogram	**4159.320**
2	Reclamation bund						
2.001	11.1.5						

EST No. :HED/CEHED/EST/105/2022_5_2_1 (Edit Id : 13)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Excavation for Structures Earthwork in excavation for structures as per drawing and technical specifications Clause 305.1 including setting out, construction of shoring and bracing, removal of stumps and other deleterious material and disposal upto a lead of 50 m, dressing of sides and bottom and backfilling in trenches with excavated suitable material. V. Marshy soil						
	Reclamation						
	protection wall along the Basin	1.000	400.000	4.000	3.000		4800.000
	Total						**4800.000**
						Total Quantity in cum	**4800.000**
2.002	12.11						
	Providing and laying filter media with granular crushed aggregates as per specification to a thickness of not less than 600 mm with smaller size towards the soil and bigger size towards the wall and providing over the entire surface behind abutment, wing wall, return wall to the full height, compacted to firm condition complete as per drawing and technical specification Clause 1204.3.8						
	for the filter media having 6mm and 20 mm broken stones						
	along basin	1.000	400.000	0.150	6.000		360.000
	Total						**360.000**
						Total Quantity in cum	**360.000**

PRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

EST No. :HED/CEHED/EST/105/2022_5_4_4 (Edit Id : 8)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in kasaragod District -Construction of Wharf and Auction Hall-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Auction hall and wharf**			
1.001	12.22			
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.			
	Net Total	49.000MT	@120610.74/MT	5909926.26
1.002	12.23.3			
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm			
	Net Total	1969.200metre	@6921.99/metre	13630782.71
1.003	OD216/2022-2023			
	Providing and fixing reinforcement using High Corrosion Resistant (HCR) for the RCC works for superstructure including conveying, straightening, cutting, bending and tying in position etc. complete as per drawings, detailed specifications and directions of the Engineer-in-charge.			
	Net Total	184.211MT	@97850.12/MT	18025068.46
1.004	14.1.C.1			
	Furnishing and Placing Reinforced Cement Concrete Grade M30 Using Concrete Mixer in super-structure as per drawing and Technical Specification			
	Net Total	720.000cum	@8928.54/cum	6428548.80
			Heading Total(Rs)	43994326.23
2	**Auction hall- beams and slabs**			
2.001	10.22			
	Welding by gas or electric plant including transportation of plant at site etc. complete.			
	Net Total	80500.000cm	@3.90/cm	313950.00
2.002	OD220/2022-2023			
	Extra for addition of synthetic polyester triangular fibre of length 12 mm, effective diameter 10-40 microns and specific gravity of 1.34 to 1.40 in cement concrete/RCC/ Flooring / water retaining structures by using 125 gms of synthetic polyester triangular fibre for 50 kgs cement used as per directions of Engineer -in- Charge based on 4.18			
	Net Total	300.000kg	@564.07/kg	169221.00

EST No. :HED/CEHED/EST/105/2022_5_4_4 (Edit Id : 8)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
2.003	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	1050.000sqm	@800.47/sqm	840493.50
2.004	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	540.000sqm	@637.63/sqm	344320.20
2.005	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	290.000sqm	@847.44/sqm	245757.60
2.006	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	1955.000sqm	@262.57/sqm	513324.35
2.007	13.7.1			
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	1005.000sqm	@393.71/sqm	395678.55
2.008	OD1854/2022-2023			
	Providing and fixing Ist quality ceramic glazed wall tiles conforming to IS: 15622(thickness to be specified by the manufacturer), of approved make, in all colours,shades except burgundy, bottle green, black of any size as approved by Engineerin-Charge,in skirting, risers of steps and dados, over 12 mm thick bed of cementmortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @3.3kg per sqm, including pointing in white cement mixed with pigment of matchingshade complete. (Based on 8.31 DAR)			
	Net Total	120.000sqm	@1190.03/sqm	142803.60
2.009	OD215/2022-2023			
	Providing and laying industrial floor tiles (12 mm thickness textured) of 1st quality conforming to IS :4457 of approved make ,in clours such as white ,ivory ,grey, fume red brown ,laid on 20 mm thick cement mortar 1:4 (1 cement:4 coarse sand), including pointing the joints with white cement and matching pigment etc .' complete Details of cost for 1 sqm MATERIAL Industrial floor tiles 300x300 mm size = 1 sqm Add for wastage & breakage @ 2.5% = 0.025 sqm Total = 1.025 sqm			
	Net Total	900.000sqm	@1903.73/sqm	1713357.00
2.010	OD221/2022-2023			
	wearing coat on deck slab using cement concrete 1:1.5:3 using 15mm broken stone for a thickness of 50mm including finishing with abrasion resistant hard top or equivalent chemical confirming to IS 1237 C-1980 &4kg/m2 of flooring including floated hard and trowelled smooth in 2 layers inclusive of all labour charges etc and including provision for making necessary grooves			

EST No. :HED/CEHED/EST/105/2022_5_4_4 (Edit Id : 8)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	for various joints but excluding cost of joint fillior and labour charges for filling."			
	Net Total	1300.000sqm	@652.60/sqm	848380.00
2.011	13.43.1			
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer			
	Net Total	1765.000sqm	@69.33/sqm	122367.45
2.012	13.46.1			
	Finishing walls with Acrylic Smooth exterior paint of required shade:New work (Two or more coat applied @ 1.67 ltr/10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/10 sqm)			
	Net Total	1004.400sqm	@190.25/sqm	191087.10
2.013	13.44.1			
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)			
	Net Total	1852.000sqm	@105.36/sqm	195126.72
	Heading Total(Rs)			6035867.07
	Total Estimation PAC			50030193.30
4	**Extra Charges**			
3.001	Provision for GST			
	50030193.30		18.00%	9005434.79
	Grand Total			59035628.09
	Round off			64371.91
	Rounded Total(Rs)			59100000.00
	Rupees Five Crore Ninety One Lakh			

EST No. :HED/CEHED/EST/105/2022_5_4_4 (Edit Id : 8)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in kasaragod District -Construction of Wharf and Auction Hall-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Auction hall and wharf						
1.001	12.22						
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.						
	Auction hall						
	MS liner for wharf	2*24	6.000	3.14*.75		0.047100	31.945
	auction hall	2*12	6.000	3.14*.75		0.047100	15.973
	Rounding	1.000	1.082				1.082
	Total						**49.000**
						Total Quantity in MT	**49.000**
1.002	12.23.3						
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm						
	Auction hall						
	auction hall (upto +1.6m CD level)	2*12			25.75+1.6		656.400
	Total						**656.400**
	wharf						
	wharf (upto +1.6m CD level)	2*24			25.75+1.6		1312.800
	Total						**1312.800**
						Total Quantity in metre	**1969.200**
1.003	OD216/2022-2023						
	Providing and fixing reinforcement using High Corrosion Resistant (HCR) for the RCC works for superstructure including conveying, straightening, cutting, bending and tying in position etc. complete as per drawings, detailed specifications and directions of the Engineer-in-charge.						
	Auction hall & wharf piles						
	25 mm Dia rft	2*36*8	27.350			0.003850	60.651
	lap 25mm	2*36*8*2	1.000			0.003850	4.435

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EST No. :HED/CEHED/EST/105/2022_5_4_4 (Edit Id : 8)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	10 mm stirrups at 20cm c/c	2*36*125	3.140	0.650		0.000620	11.389
	stiffner 12mm	2*36*6	3.140	0.650		0.000890	0.785
	Total						**77.260**
	Auction hall-beam and slab						
	main beam for auction hall LS Wt taken @ 120Kg/m3	2.000	60.000	0.300	0.550	0.120000	2.376
	main beam for Wharf @ 120Kg/m3	2.000	120.000	0.300	0.550	0.120000	4.752
	Cross Beam @ 120Kg/m3	12.000	13.000	0.300	0.550	0.120000	3.089
	end beam for auction hall @ 120Kg/m3	24.000	6.600	0.300	0.550	0.120000	3.136
	Deck slab for auction hall @ 120Kg/m3	1.000	60.000	20.000	0.200	0.120000	28.800
	wharf @ 120Kg/m3	1.000	60.000	6.500	0.200	0.120000	9.360
	-do-	1.000	60.000	6.600	0.200	0.120000	9.504
	Facia wall @ 120Kg/m3	1.000	120.000	0.200	1.500	0.120000	4.320
	rounding	1.000	1.614				1.614
	Total						**66.951**
	Auction Hall						
	Column @ 150 kg/m3	2*12	0.400	0.400	4.500	0.150000	2.592
	Column @ 150 kg/m3	1*12	0.400	0.400	6.000	0.150000	1.728
	Beams @ 150 kg/m3	3.000	60.000	0.300	0.550	0.150000	4.455
	Beams @ 150 kg/m3	12*2	6.150	0.350	0.550	0.150000	4.262
	Beams @ 150 kg/m3	2.000	62.000	8.100	0.175	0.150000	26.366
	Rounding	1.000	0.597				0.597
	Total						**40.000**
						Total Quantity in MT	**184.211**
1.004	14.1.C.1						

EST No. :HED/CEHED/EST/105/2022_5_4_4 (Edit Id : 8)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Furnishing and Placing Reinforced Cement Concrete Grade M30 Using Concrete Mixer in super-structure as per drawing and Technical Specification						
	Auction hall-beam and slab						
	main beam for auction hall LS Wt taken as 120	12*2	6.000	0.300	0.550		23.760
	Cross Beam	12*4	5.200	0.300	0.550		41.184
	end beam for auction hall	12.000	5.000	0.300	0.550		9.900
	Deck slab for auction hall	1.000	60.000	15.000	0.175		157.500
	wharf beam	12*2	5.000	0.300	0.550		19.800
		12*2	5.200	0.300	0.550		20.592
	wharf	1.000	60.000	5.000	0.175		52.500
	wharf	1.000	60.000	6.600	0.175		69.300
	Facia wall	1.000	120.000	0.200	1.500		36.000
	Column	2*20	0.400	0.400	4.500		28.800
	Column	20.000	0.400	0.400	6.000		19.200
	Beam	3.000	60.000	0.300	0.550		29.700
	Beam	12*2	6.150	0.350	0.550		28.413
	Slab	2.000	62.000	8.100	0.175		175.770
	Slab	1.000	7.581				7.581
	Total						**720.000**
						Total Quantity in cum	**720.000**
2	Auction hall- beams and slabs						
2.001	10.22						
	Welding by gas or electric plant including transportation of plant at site etc. complete.						
	piles						
	lap 25mm	72*8*2*4					4608.000
	10 mm stirrups at 20cm c/c	72*12 5*8					72000.000
	stiffner 12mm c/c	72*6*8					3456.000
	Rounding	436.000					436.000
	Total						**80500.000**
						Total Quantity in cm	**80500.000**
2.002	OD220/2022-2023						

EST No. :HED/CEHED/EST/105/2022_5_4_4 (Edit Id : 8)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Extra for addition of synthetic polyester triangular fibre of length 12 mm, effective diameter 10-40 microns and specific gravity of 1.34 to 1.40 in cement concrete/RCC/ Flooring / water retaining structures by using 125 gms of synthetic polyester triangular fibre for 50 kgs cement used as per directions of Engineer -in- Charge based on 4.18						
	Synthetic Fibre - slab						
	Deck slab for auction hall (406.67x0.125/50 = 1.017)	1.000	60.000	15.000	0.175	1.017000	160.178
	wharf (406.67x0.125/50 = 1.017)	1.000	60.000	5.000	0.175	1.017000	53.393
	wharf (406.67x0.125/50 = 1.017)	1.000	60.000	6.600	0.175	1.017000	70.478
	Rounding	1.000	15.951				15.951
	Total						**300.000**
						Total Quantity in kg	**300.000**
2.003	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	slab						
	slab	2.000	62.000	8.100			1004.400
	rounding	1.000	24.900				24.900
	Total						**1029.300**
	beam						
		-2.000	60.000	0.300			-36.000
		12.000	13.500	0.350			56.700
	Total						**20.700**
						Total Quantity in sqm	**1050.000**
2.004	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	beam						
		3.000	60.000	1.400			252.000
		12*2	8.100	1.450			281.880
	rounding	1.000	6.120				6.120
	Total						**540.000**
						Total Quantity in sqm	**540.000**
2.005	5.9.6						

EST No. :HED/CEHED/EST/105/2022_5_4_4 (Edit Id : 8)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	Auction hall column						
	columns	2*12	1.600		4.500		172.800
		12.000	1.600		6.000		115.200
	rounding	1.000	2.000				2.000
	Total						**290.000**
						Total Quantity in sqm	**290.000**
2.006	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	Auction hall						
	column	2*20	1.600		4.500		288.000
	column	20.000	1.600		6.000		192.000
	beam	3.000	60.000	1.400			252.000
	beam	12*2	6.150	1.450			214.020
	slab	2.000	62.000	8.100			1004.400
	rounding	1.000	4.580				4.580
	Total						**1955.000**
						Total Quantity in sqm	**1955.000**
2.007	13.7.1						
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)						
	slab						
		2.000	62.000	8.100			1004.400
	rounding	1.000	0.600				0.600
	Total						**1005.000**
						Total Quantity in sqm	**1005.000**
2.008	OD1854/2022-2023						
	Providing and fixing Ist quality ceramic glazed wall tiles conforming to IS: 15622(thickness to be specified by the manufacturer), of approved make, in all colours,shades except burgundy, bottle green, black of any size as approved by Engineerin-Charge,in skirting, risers of steps and dados, over 12 mm thick bed of cementmortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @3.3kg per sqm, including pointing in white cement mixed with pigment of matchingshade complete. (Based on 8.31 DAR)						
	For Column						
	Column	3*12	1.600	2.000		1.000000	115.200
	rounding	1.000	4.800				4.800
	Total						**120.000**

EST No. :HED/CEHED/EST/105/2022_5_4_4 (Edit Id : 8)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in sqm	**120.000**
2.009	OD215/2022-2023						
	Providing and laying industrial floor tiles (12 mm thickness textured) of 1st quality conforming to IS :4457 of approved make ,in clours such as white ,ivory ,grey, fume red brown ,laid on 20 mm thick cement mortar 1:4 (1 cement:4 coarse sand), including pointing the joints with white cement and matching pigment etc .' complete Details of cost for 1 sqm MATERIAL Industrial floor tiles 300x300 mm size = 1 sqm Add for wastage & breakage @ 2.5% = 0.025 sqm Total = 1.025 sqm						
	Auction hall						
		1.000	60.000	15.000			900.000
	Total						**900.000**
						Total Quantity in sqm	**900.000**
2.010	OD221/2022-2023						
	wearing coat on deck slab using cement concrete 1:1.5:3 using 15mm broken stone for a thickness of 50mm including finishing with abrasion resistant hard top or equivalent chemical confirming to IS 1237 C-1980 &4kg/m2 of flooring including floated hard and trowelled smooth in 2 layers inclusive of all labour charges etc and including provision for making necessary grooves for various joints but excluding cost of joint fillior and labour charges for filling."						
	wharf						
		60.000	15.000				900.000
		60.000	6.600				396.000
	rounding	1.000	4.000				4.000
	Total						**1300.000**
						Total Quantity in sqm	**1300.000**
2.011	13.43.1						
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	Auction hall						
	column	2*20	1.600		2.500		160.000
	column	20.000	1.600		4.000		128.000
	beam	3.000	60.000	1.400			252.000
	beam	12*2	6.150	1.450			214.020
	slab	2.000	62.000	8.100			1004.400
	rounding	1.000	6.580				6.580
	Total						**1765.000**
						Total Quantity in sqm	**1765.000**
2.012	13.46.1						

EST No. :HED/CEHED/EST/105/2022_5_4_4 (Edit Id : 8)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Finishing walls with Acrylic Smooth exterior paint of required shade:New work (Two or more coat applied @ 1.67 ltr/10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/10 sqm)						
	slab						
		2.000	62.000	8.100			1004.400
	Total						**1004.400**
						Total Quantity in sqm	**1004.400**
2.013	13.44.1						
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)						
	Auction hall						
	column	2*20	1.600		2.500		160.000
	column	20.000	1.600		4.000		128.000
	beam	3.000	60.000	1.400			252.000
	beam	12*2	6.150	1.450			214.020
	slab	2.000	62.000	8.100			1004.400
	rounding	1.000	5.920				5.920
	Total						**1764.340**
	deduction -beam						
		2.000	60.000	0.300			36.000
		12*2.000	6.150	0.350			51.660
	Total						**87.660**
						Total Quantity in sqm	**1852.000**

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Construction of Canteen, Rest shed, Locker room and gear shed-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Locker Rooms, Shop Rooms, Canteen & Net mending shed**			
1.001	2.31			
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared			
	Net Total	1000.000sqm	@14.48/sqm	14480.00
1.002	2.33.1			
	Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth			
	Net Total	10.000each	@439.60/each	4396.00
1.003	2.8.1			
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil			
	Net Total	790.000cum	@291.42/cum	230221.80
1.004	OD1735/2022-2023			
	Coconut Pile - Supplying and stacking well matured straight coconut post for driving down through various strata bellow bed level including cost conveyance labor charges etc complete.			
	Net Total	1800.000metre	@136.76/metre	246168.00
1.005	OD149/2022-2023			
	OD 6380 / 2020-2021 : Coconut Pile - Driving down coconut pile to lines and levels through soft to medium clay soil strata including all hire charges and labour and all other appliances necessary for pile driving down after pointing the bottom end. Details for one post of 6m long 15 numbers per day 6X15 = 90m Details for 90m length			
	Net Total	1800.000metre	@213.34/metre	384012.00
1.006	OD1736/2022-2023			
	Bailing out water Using 5HP Pump- Bailing out water with 5HP engine and pump set including conveyance to site and erection, cost of fuel, lubrication oil and other			

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	stores, pay of staff etc complete			
	Net Total	240.000hour	@372.81/hour	89474.40
1.007	60.7.2			
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.			
	Net Total	122.000cum	@2557.65/cum	312033.30
1.008	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	175.000cum	@6687.21/cum	1170261.75
1.009	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	73.000cum	@7069.78/cum	516093.94
1.010	50.2.25.1			
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge			
	Net Total	200.000cum	@515.98/cum	103196.00
1.011	5.1.2			
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size			
	Net Total	118.000cum	@8914.94/cum	1051962.92
1.012	5.2.2			
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)			
	Net Total	52.000cum	@10748.82/cum	558938.64
1.013	5.3			
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).			

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	271.000cum	@11277.61/cum	3056232.31
1.014	5.22.6			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - Mechanically Treated bars of grade Fe-500D or more			
	Net Total	53700.000kilogram	@96.46/kilogram	5179902.00
1.015	10.6.2			
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.20 mm M.S. laths with 1.20 mm thick top cover			
	Net Total	100.000sqm	@3238.32/sqm	323832.00
1.016	10.7			
	Providing and fixing ball bearing for rolling shutters.			
	Net Total	24.000no	@484.97/no	11639.28
1.017	50.6.1.5			
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x20cm or nearest available size confirming to IS 2185 Part I of 1979 for super structure up to floor two level thickness 20cm and above in: CM 1:6 (1 cement : 6 coarse sand) etc complete			
	Net Total	180.000cum	@6580.80/cum	1184544.00
1.018	50.6.2.1			
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x15 cm or nearest available size confirming to IS 2185 part I of 1979 for foundation and plinth with thickness 15cm in: CM 1:6 (1 cement :6 coarse sand) etc complete			
	Net Total	15.000cum	@6179.60/cum	92694.00
1.019	9.1.1			
	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately).Second class teak wood			
	Net Total	2.300cum	@150367.20/cum	345844.56
1.020	9.7.1			
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick:Second class teak wood			

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	25.000sqm	@3398.47/sqm	84961.75
1.021	9.9.1.2			
	Providing and fixing glazed shutters for door, windows and clerestory windows using 4 mm thick float glass panes including ISI marked M.S. Pressed butt hinges bright finished of required size with necessary screws.30 mm thick			
	Net Total	53.000sqm	@4575.39/sqm	242495.67
1.022	9.48.2			
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc			
	Net Total	830.000kg	@211.94/kg	175910.20
1.023	9.53			
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	188.000each	@207.00/each	38916.00
1.024	13.1.1			
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	1290.000sqm	@308.22/sqm	397603.80
1.025	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	1945.000sqm	@262.57/sqm	510698.65
1.026	13.11			
	18 mm cement plaster in two coats under layer 12 mm thick cement plaster 1:5 (1 cement : 5 coarse sand) finished with a top layer 6 mm thick cement plaster 1:6 (1 cement : 6 fine sand).			
	Net Total	1255.000sqm	@461.20/sqm	578806.00
1.027	11.41.2			
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.			
	Net Total	590.000sqm	@1733.20/sqm	1022588.00
1.028	OD156/2022-2023			
	Providing and laying industrial floor tiles (12 mm thickness textured) of 1st quality conforming to IS :4457 of approved make ,in clours such as white ,ivory ,grey, fume red brown ,laid on 20 mm thick cement mortar 1:4 (1 cement:4 coarse sand), including pointing the joints with white cement and matching pigment etc .' complete Details of cost for 1 sqm MATERIAL Industrial floor tiles 300x300 mm size = 1 sqm Add for wastage & breakage @ 2.5% = 0.025			

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(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	sqm Total = 1.025 sqm			
	Net Total	260.000sqm	@1903.73/sqm	494969.80
1.029	9.97.3			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm			
	Net Total	28.000no	@103.95/no	2910.60
1.030	50.9.15.1			
	Supplying and fixing 200 mm Aluminium aldrop			
	Net Total	14.000no	@171.51/no	2401.14
1.031	9.100.2			
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm			
	Net Total	14.000no	@61.02/no	854.28
1.032	50.9.15.4			
	Providing and fixing iron hooks and eyes: 150 mm			
	Net Total	52.000no	@16.42/no	853.84
1.033	50.9.15.5			
	Providing and fixing iron hooks and eyes: 100 mm			
	Net Total	156.000no	@14.10/no	2199.60
1.034	13.37.1			
	White washing with lime to give an even shade:New work (three or more coats)			
	Net Total	3808.418sqm	@32.96/sqm	125525.46
1.035	13.44.1			
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)			
	Net Total	3808.418sqm	@105.36/sqm	401254.92
1.036	13.62.1			
	Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade:Two or more coats on new work over an under coat of suitable shade with ordinary paint of approved brand and manufacture .			
	Net Total	370.000sqm	@204.63/sqm	75713.10
1.037	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	210.000sqm	@329.03/sqm	69096.30
1.038	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended			

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Sl No	Specification	Quantity	Rate	Amount
	floors, roofs, landings, balconies and access platform			
	Net Total	1100.000sqm	@800.47/sqm	880517.00
1.039	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	1162.000sqm	@637.63/sqm	740926.06
1.040	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	365.000sqm	@847.44/sqm	309315.60
1.041	5.9.16.1			
	Centering and shuttering including strutting, etc. and removal of form for: Edges of slabs and breaks in floors and wallsUnder 20 cm wide			
	Net Total	225.000metre	@200.11/metre	45024.75
	Heading Total(Rs)			21079469.42
	Total Estimation PAC			21079469.42
3	**Extra Charges**			
2.001	Provision for GST			
		21079469.42	18.00%	3794304.50
	Grand Total			24873773.92
	Round off			26226.08
	Rounded Total(Rs)			24900000.00
	Rupees Two Crore Forty Nine Lakh			

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DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Construction of Canteen, Rest shed, Locker room and gear shed-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Locker Rooms, Shop Rooms, Canteen & Net mending shed						
1.001	2.31						
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared						
	for Net mending shed and locker rooms						
	Net mending shed and locker rooms	1.000	50.000	20.000			1000.000
	Total						**1000.000**
						Total Quantity in sqm	**1000.000**
1.002	2.33.1						
	Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth						
	Trees						
	Trees	10.000					10.000
	Total						**10.000**
						Total Quantity in each	**10.000**
1.003	2.8.1						
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil						
	for wall						
	long wall	3.000	44.000	1.800	1.950		463.320
	cross wall	14*2	3.200	1.800	1.950		314.496
	Rounding	1.000	12.183				12.183
	Rounding	1.000	0.001				0.001
	Total						**790.000**
						Total Quantity in cum	**790.000**
1.004	OD1735/2022-2023						

File No. HECE/207/2022-DR8 (Computer No. 19397)

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EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Coconut Pile - Supplying and stacking well matured straight coconut post for driving down through various strata bellow bed level including cost conveyance labor charges etc complete.						
	For Net mending shed and locker rooms						
	Foundation	450.000	4.000			1.000000	1800.000
	Total						**1800.000**
						Total Quantity in metre	**1800.000**
1.005	OD149/2022-2023						
	OD 6380 / 2020-2021 : Coconut Pile - Driving down coconut pile to lines and levels through soft to medium clay soil strata including all hire charges and labour and all other appliances necessary for pile driving down after pointing the bottom end. Details for one post of 6m long 15 numbers per day 6X15 = 90m Details for 90m length						
	for foundation						
	for foundation	450.000	4.000				1800.000
	Total						**1800.000**
						Total Quantity in metre	**1800.000**
1.006	OD1736/2022-2023						
	Bailing out water Using 5HP Pump- Bailing out water with 5HP engine and pump set including conveyance to site and erection, cost of fuel, lubrication oil and other stores, pay of staff etc complete						
	For Net mending shed and locker rooms						
	Foundation (Footing)	30.000	8.000			1.000000	240.000
	Total						**240.000**
						Total Quantity in hour	**240.000**
1.007	60.7.2						
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.						
	for wall						
	long wall	3.000	44.000	1.800	0.300		71.280
	cross wall	14*2	3.200	1.800	0.300		48.384
	rounding	1.000	2.336				2.336
	Total						**122.000**
						Total Quantity in cum	**122.000**
1.008	4.1.8						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	strip footing bottom						
	Long wall	3.000	44.000	1.800	0.150		35.640
	cross wall	14*2	3.200	1.800	0.150		24.192
	rounding	1.000					1.000
	Total						**60.832**
	RR masonry bottom						
	Long wall	3.000	44.000	0.750	0.150		14.850
	cross wall	14*2	4.250	0.750	0.150		13.388
	rounding	1.000	1.928				1.928
	Total						**30.166**
	flooring						
	net mending shed	1.000	23.200	10.000	0.100		23.200
	locker and shop rooms	1.000	3.100	3.500	0.100		1.085
	verandah	2.000	16.200	1.500	0.100		4.860
	step	2*2	45.000	0.300	1.000		54.000
	rounding	1.000	0.857	1.000	1.000		0.857
	Total						**84.002**
						Total Quantity in cum	**175.000**
1.009	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	RR masonry						
	Long wall	3.000	44.000	0.450	0.600		35.640
	cross wall	14*2	4.550	0.450	0.600		34.398
	rounding	1.000	2.962				2.962
	Total						**73.000**
						Total Quantity in cum	**73.000**
1.010	50.2.25.1						
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge						
	filling						
	net mending shed	1.000	23.000	10.000	0.500		115.000

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	locker and shop rooms	10.000	3.100	3.500	0.500		54.250
	veranda	2.000	16.200	1.500	0.500		24.300
	rounding	1.000	6.450				6.450
	Total						**200.000**
						Total Quantity in cum	**200.000**
1.011	5.1.2						
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size						
	strip footing						
	long wall	3.000	44.000	1.500	0.200		39.600
	long wall	3.000	44.000	0.300	0.250		9.900
	cross wall	14*2	3.500	1.500	0.200		29.400
	cross wall	14*2	3.500	0.300	0.250		7.350
	Total						**86.250**
	plinth beam						
	long wall	3.000	44.000	0.300	0.450		17.820
	cross wall	14*2	5.000	0.300	0.300		12.600
	rpounding	1.000	1.330				1.330
	Total						**31.750**
						Total Quantity in cum	**118.000**
1.012	5.2.2						
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)						
	column						
	GF	3*14	0.450	0.300	5.500		31.185
	FF	3*14	0.450	0.300	3.500		19.845
	rounding	1.000	0.970		1.000		0.970
	Total						**52.000**
						Total Quantity in cum	**52.000**
1.013	5.3						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).						
	GF lintel, sunshade						
	GF sunshade	1.000	112.000	0.900	0.080		8.064
	GF lintel all round	1.000	108.400	0.200	0.200		4.336
	locker and shop rooms front side	2.000	16.800	0.200	0.200		1.344
	do- cross wall	4.000	7.000	0.200	0.150		0.840
	do- long wall	4.000	16.800	0.200	0.150		2.016
	stair room	2.000	32.000	0.200	0.150		1.920
	Total						**18.520**
	GF roof slabs						
	GF	1.000	46.200	11.200	0.150		77.616
	Stair landing	2.000	5.500	1.500	0.150		2.475
		2.000	2.500	1.500	0.150		1.125
		2.000	3.100	1.500	0.150		1.395
	step	2*25	1.500	0.300	0.150		3.375
	Deduct stair room roof	-1.000	4.800	11.200	0.150		-8.064
	Total						**77.922**
	GF beams						
	GF 1	14.000	10.000	0.300	0.500		21.000
	GF 2	3.000	45.000	0.300	0.350		14.175
	Total						**35.175**
	FF lintel, sunshade						
	FF sunshade	1.000	112.000	0.900	0.080		8.064
	FF lintel all round	1.000	108.400	0.200	0.200		4.336
	lintel rooms front side	2.000	16.800	0.200	0.200		1.344
	do-cross wall	4.000	7.000	0.200	0.150		0.840
	do-long wall	1.000	16.800	0.200	0.150		0.504
	stair room	2.000	32.000	0.200	0.150		1.920
	Total						**17.008**
	FF roof slabs						
	FF	1.000	46.200	11.200	0.150		77.616

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	stair landing	2.000	5.500	1.500	0.150		2.475
		2.000	2.500	1.500	0.150		1.125
		2.000	3.100	1.500	0.150		1.395
	step	2*25	1.500	0.300	0.150		3.375
	Total						**85.986**
	FF beams						
	FF 1	14.000	10.000	0.300	0.500		21.000
	FF 2	3.000	45.000	0.300	0.350		14.175
	rounding	1.000	1.214				1.214
	Total						**36.389**
						Total Quantity in cum	**271.000**
1.014	5.22.6						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - Mechanically Treated bars of grade Fe-500D or more						
	Strip footing						
	for strip footing	1.000	86.250			120.000000	10350.000
	Total						**10350.000**
	Plinth beam						
	for Plinth beam	1.000	31.750			150.000000	4762.500
	Total						**4762.500**
	Column						
	for column	1.000	52.000			150.000000	7800.000
	Total						**7800.000**
	GF lintel, sunshade						
	for GF lintel, sunshade	1.000	18.520			100.000000	1852.000
	Total						**1852.000**
	GF Roof slab						
	for GF Roof slab	1.000	77.922			100.000000	7792.200
	Total						**7792.200**
	GF beams						
	for GF beams	1.000	35.175			150.000000	5276.250
	Total						**5276.250**

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(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	FF lintel, Sunshade						
	for FF lintel, Sunshade	1.000	17.008			100.000000	1700.800
	Total						**1700.800**
	FF roof slab						
	for FF roof slab	1.000	85.986			100.000000	8598.600
	Total						**8598.600**
	FF beams						
	for FF beams	1.000	36.389			150.000000	5458.350
	Total						**5458.350**
	Rounding						
		1.000	109.300				109.300
	Total						**109.300**
						Total Quantity in kilogram	**53700.000**
1.015	10.6.2						
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.20 mm M.S. laths with 1.20 mm thick top cover						
	RS						
	FF	10.000	3.100	2.400			74.400
	GF	2.000	4.800	2.400			23.040
	rounding	1.000	2.560				2.560
	Total						**100.000**
						Total Quantity in sqm	**100.000**
1.016	10.7						
	Providing and fixing ball bearing for rolling shutters.						
	GF						
	GF	12*2					24.000
	Total						**24.000**
						Total Quantity in no	**24.000**
1.017	50.6.1.5						

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x20cm or nearest available size confirming to IS 2185 Part I of 1979 for super structure up to floor two level thickness 20cm and above in: CM 1:6 (1 cement : 6 coarse sand) etc complete						
	GF						
	net mending shed above lintel level	1.000	56.000	0.200	0.600		6.720
	locker and shop rooms	5.000	7.000	0.200	3.100		21.700
		3.000	15.000	0.200	3.250		29.250
	verandah	2.000	15.000	0.200	0.600		3.600
	stair room	1.000	34.000	0.200	9.000		61.200
	Total						**122.470**
	Deduction GF						
	RS	-10.000	3.100	0.200	2.400		-14.880
		-2.000	4.800	0.200	2.400		-4.608
	Total						**-19.488**
	FF						
	canteen	1.000	56.000	0.200	3.100		34.720
	verandah above lintel level	2.000	15.000	0.200	0.900		5.400
	rooms	5.000	7.000	0.200	3.100		21.700
		3.000	15.000	0.200	3.250		29.250
	Total						**91.070**
	Deduction FF						
	D 90X120	-14.000	0.900	0.200	1.200		-3.024
	W3 150X150	-26.000	1.500	0.200	1.500		-11.700
	Total						**-14.724**
	rounding						
		1.000	0.672				0.672
	Total						**0.672**
						Total Quantity in cum	**180.000**
1.018	50.6.2.1						
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x15 cm or nearest available size confirming to IS 2185 part I of 1979 for foundation and plinth with thickness 15cm in: CM 1:6 (1 cement :6 coarse sand) etc complete						
	parapet						
	parapet	1.000	115.000	0.150	0.700		12.075

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	2.925				2.925
	Total						**15.000**
						Total Quantity in cum	**15.000**
1.019	9.1.1						
	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately).Second class teak wood						
	First floor						
	D 90x210	14.000	37.632/1000			1.000000	0.527
	W3 150x150	26.000	66.460/1000			1.000000	1.728
	Rounding	1.000	0.045			1.000000	0.045
	Total						**2.300**
						Total Quantity in cum	**2.300**
1.020	9.7.1						
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick:Second class teak wood						
	Door						
	D 90X120	14.000	1.591				22.274
	rounding	1.000	2.726				2.726
	Total						**25.000**
						Total Quantity in sqm	**25.000**
1.021	9.9.1.2						
	Providing and fixing glazed shutters for door, windows and clerestory windows using 4 mm thick float glass panes including ISI marked M.S. Pressed butt hinges bright finished of required size with necessary screws.30 mm thick						
	window						
	W3 150X150	26.000	1.940				50.440
	rounding	1.000	2.560				2.560
	Total						**53.000**
						Total Quantity in sqm	**53.000**
1.022	9.48.2						
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc						

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EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	window						
	W3 150X150	26.000	13.000	1.500	1.560		790.920
	add 5%	1.000	36.000				36.000
	rounding	1.000	3.080				3.080
	Total						**830.000**
						Total Quantity in kg	**830.000**
1.023	9.53						
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	hold fast						
	D 90X120	14.000	6.000				84.000
	W3 150X150	26.000	4.000				104.000
	Total						**188.000**
						Total Quantity in each	**188.000**
1.024	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	Inside wall						
	locker and shop rooms	10.000	13.200		3.100		409.200
	verandah	2*2	15.000		0.600		36.000
	net mending shed - above lintel level	1.000	56.000		0.600		33.600
	strair room	2.000	18.700		9.000		336.600
	canteen	1.000	66.000		3.100		204.600
	rooms	10.000	13.200		3.100		409.200
	Passage	1.000	13.500		3.000		40.500
	rounding	1.000	2.700				2.700
	Total						**1472.400**
	Deductions						
	D 90x210	-14.000	0.900		2.100		-26.460
	R S	-10.000	3.100		2.400		-74.400
		-2.000	4.800		2.400		-23.040
	window	-26.000	1.500		1.500		-58.500
	Total						**-182.400**

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in sqm	**1290.000**
1.025	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	ceiling-ground floor						
	net mending shed	1.000	23.200	10.000			232.000
	stair room	2.000	9.400	4.800			90.240
	verandah- GF	2.000	16.200	1.450			46.980
	shop rooms and locker rooms	10.000	3.100	3.500			108.500
	sunshade	1.000	113.600	0.900			102.240
	rounding	1.000	5.519				5.519
	Total						**585.479**
	ceiling-first floor						
	canteen	1.000	23.200	10.000			232.000
	verandah	2.000	16.200	1.450			46.980
	rooms	10.000	3.100	3.500			108.500
	sunshade	1.000	113.600	0.900			102.240
	rounding	1.000	5.519				5.519
	Total						**495.239**
	column						
	Ground floor	3*14	1.500		3.100		195.300
	First floor	3*14	1.500		3.100		195.300
	rounding	1.000	10.000				10.000
	Total						**400.600**
	ground floor-beams						
	GF 1	14.000	10.000	1.000			140.000
	GF 2	3.000	45.000	0.600			81.000
	rounding	1.000	10.000				10.000
	Total						**231.000**
	FF beams						
	FF 1	14.000	10.000	1.000			140.000
	FF 2	3.000	45.000	0.600			81.000
	rounding	1.000	11.682				11.682
	Total						**232.682**
						Total Quantity in sqm	**1945.000**
1.026	13.11						

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	18 mm cement plaster in two coats under layer 12 mm thick cement plaster 1:5 (1 cement : 5 coarse sand) finished with a top layer 6 mm thick cement plaster 1:6 (1 cement : 6 fine sand).						
	outer wall						
	ground floor	1.000	110.000		0.600		66.000
	ground floor	1.000	110.000		3.100		341.000
	rounding	1.000					1.000
	Total						**408.000**
	parappet,roof top						
	first floor	2.000	111.000		0.750		166.500
	roof slab top	1.000	45.400		10.400		472.160
	sunshade top	2.000	113.600		0.900		204.480
	rounding	1.000	3.860				3.860
	Total						**847.000**
						Total Quantity in sqm	**1255.000**
1.027	11.41.2						
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.						
	Flooring						
	shop room and locker room	10.000	3.500	3.100			108.500
	verandah - GF	2.000	16.200	1.500			48.600
	Step	2*25	1.500	0.300			22.500
		2*25	1.500	0.150			11.250
	Landing	2*3	1.500	1.500			13.500
	Canteen	1.000	23.200	9.600			222.720
	rooms	10.000	3.500	3.100			108.500
	verandah	2.000	16.200	1.500			48.600
	rounding	1.000	5.830				5.830
	Total						**590.000**
						Total Quantity in sqm	**590.000**
1.028	OD156/2022-2023						

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and laying industrial floor tiles (12 mm thickness textured) of 1st quality conforming to IS :4457 of approved make ,in clours such as white ,ivory ,grey, fume red brown ,laid on 20 mm thick cement mortar 1:4 (1 cement:4 coarse sand), including pointing the joints with white cement and matching pigment etc .' complete Details of cost for 1 sqm MATERIAL Industrial floor tiles 300x300 mm size = 1 sqm Add for wastage & breakage @ 2.5% = 0.025 sqm Total = 1.025 sqm						
	flooring						
	net mending shed	1.000	23.200	10.000		1.000000	232.000
	rounding	1.000	28.000			1.000000	28.000
	Total						**260.000**
						Total Quantity in sqm	**260.000**
1.029	9.97.3						
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm						
	150mm						
	Doors	14.000	2.000				28.000
	Total						**28.000**
						Total Quantity in no	**28.000**
1.030	50.9.15.1						
	Supplying and fixing 200 mm Aluminium aldrop						
	doors						
	Doors	14.000	1.000				14.000
	Total						**14.000**
						Total Quantity in no	**14.000**
1.031	9.100.2						
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm						
	doors						
	Doors	14.000	1.000				14.000
	Total						**14.000**
						Total Quantity in no	**14.000**
1.032	50.9.15.4						
	Providing and fixing iron hooks and eyes: 150 mm						
	Windows						
		26.000	2.000				52.000

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**52.000**
						Total Quantity in no	**52.000**
1.033	50.9.15.5						
	Providing and fixing iron hooks and eyes: 100 mm						
	windows						
		26.000	3.000	2.000			156.000
	Total						**156.000**
						Total Quantity in no	**156.000**
1.034	13.37.1						
	White washing with lime to give an even shade:New work (three or more coats)						
	inside wall						
	locker and shop rooms	10.000	13.200		3.100		409.200
	verandah	2*2	15.000		0.600		36.000
	net mending shed - above lintel level	1.000	56.000		0.600		33.600
	strair room	2.000	18.700		9.000		336.600
	canteen	1.000	66.000		3.100		204.600
	rooms	10.000	13.200		3.100		409.200
	Passage	1.000	13.500		3.000		40.500
	rounding	1.000					1.000
	Total						**1470.700**
	Deductions						
	D 90x210	-14.000	0.900		2.100		-26.460
	R S	-10.000	3.100		2.400		-74.400
		-2.000	4.800		2.400		-23.040
	window	-26.000	1.500		1.500		-58.500
	Total						**-182.400**
	ceiling-ground floor						
	net mending shed	1.000	23.200	10.000			232.000
	stair room	2.000	9.400	4.800			90.240
	verandah- GF	2.000	16.200	1.450			46.980
	shop rooms and locker rooms	10.000	3.100	3.500			108.500
	sunshade	1.000	113.600	0.900			102.240

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	5.519				5.519
	Total						**585.479**
	ceiling-first floor						
	canteen	1.000	23.200	10.000			232.000
	verandah	2.000	16.200	1.450			46.980
	rooms	10.000	3.100	3.500			108.500
	sunshade	1.000	113.600	0.900			102.240
	rounding	1.000	5.519				5.519
	Total						**495.239**
	column						
	Ground floor	3*14	1.500		3.100		195.300
	First floor	3*14	1.500		3.100		195.300
	rounding	1.000	10.000				10.000
	Total						**400.600**
	ground floor-beams						
	GF 1	14.000	10.000	1.000			140.000
	GF 2	3.000	45.000	0.600			81.000
	rounding	1.000	10.000				10.000
	Total						**231.000**
	First floor-beams						
	FF 1	14.000	10.000	1.000			140.000
	FF 2	3.000	45.000	0.600			81.000
	rounding	1.000	10.000				10.000
	Total						**231.000**
	outer wall						
	ground floor	1.000	110.000		0.600		66.000
	first floo	1.000	110.000		3.100		341.000
	rounding	1.000					1.000
	Total						**408.000**
	parappet						
	first floor	2.000	111.000		0.750		166.500
	first floor	1.000	2.300				2.300
	Total						**168.800**
						Total Quantity in sqm	**3808.418**
1.035	13.44.1						
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)						

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	painting						
	locker and shop rooms	10.000	13.200		3.100	1.000000	409.200
	verandah	2*2	15.000		0.600	1.000000	36.000
	net mending shed - above lintel level	1.000	56.000		0.600	1.000000	33.600
	strair room	2.000	18.700		9.000	1.000000	336.600
	canteen	1.000	66.000		3.100	1.000000	204.600
	rooms	10.000	13.200		3.100	1.000000	409.200
	Passage	1.000	13.500		3.000	1.000000	40.500
	rounding	1.000				1.000000	1.000
	D 90x210	-14.000	0.900		2.100	1.000000	-26.460
	R S	-10.000	3.100		2.400	1.000000	-74.400
		-2.000	4.800		2.400	1.000000	-23.040
	window	-26.000	1.500		1.500	1.000000	-58.500
	(Ceiling GF) net mending shed	1.000	23.200	10.000		1.000000	232.000
	stair room	2.000	9.400	4.800		1.000000	90.240
	verandah- GF	2.000	16.200	1.450		1.000000	46.980
	shop rooms and locker rooms	10.000	3.100	3.500		1.000000	108.500
	sunshade	1.000	113.600	0.900		1.000000	102.240
	rounding	1.000	5.519			1.000000	5.519
	(Ceiling FF)canteen	1.000	23.200	10.000		1.000000	232.000
	verandah	2.000	16.200	1.450		1.000000	46.980
	rooms	10.000	3.100	3.500		1.000000	108.500

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	sunshade	1.000	113.600	0.900		1.000000	102.240
	rounding	1.000	5.519			1.000000	5.519
	(GF beams) GF 1	14.000	10.000	1.000		1.000000	140.000
	GF 2	3.000	45.000	0.600		1.000000	81.000
	rounding	1.000	10.000			1.000000	10.000
	(FF Beams) FF 1	14.000	10.000	1.000		1.000000	140.000
	FF 2	3.000	45.000	0.600		1.000000	81.000
	rounding	1.000	10.000			1.000000	10.000
	(Outer wall) ground floor	1.000	110.000		0.600	1.000000	66.000
	first floor	1.000	110.000		3.100	1.000000	341.000
	rounding	1.000				1.000000	1.000
	(Parapet) first floor	2.000	111.000		0.750	1.000000	166.500
	first floor	1.000	2.300			1.000000	2.300
	Total						**3407.818**
	For Column						
	Ground floor	3*14	1.500		3.100	1.000000	195.300
	First floor	3*14	1.500		3.100	1.000000	195.300
	Rounding	1.000	10.000			1.000000	10.000
	Total						**400.600**
						Total Quantity in sqm	**3808.418**
1.036	13.62.1						
	Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade:Two or more coats on new work over an under coat of suitable shade with ordinary paint of approved brand and manufacture .						
	new wood work						
	Door D	14.000	0.900	2.210	2.250		62.654
	Window	26.000	1.500	1.500	1.000		58.500

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**121.154**
	iron work						
	Iron bars window W3	26.000	3.000	0.440	1.360		46.675
	collapsible steelshutters	10.000	3.100	2.400	2.000		148.800
		2.000	4.800	2.400	2.000		46.080
	rounding	1.000	7.291	1.000	1.000		7.291
	Total						**248.846**
						Total Quantity in sqm	**370.000**
1.037	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	Strip footing						
	Long wall	3*2	44.000		0.200		52.800
		3*2	44.000		0.250		66.000
	cross wall	14*2*2	3.500		0.200		39.200
		14*2*2	3.500		0.250		49.000
	rounding	3.000	1.000				3.000
	Total						**210.000**
						Total Quantity in sqm	**210.000**
1.038	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Ground floor -roof slab						
	GF	1.000	46.200	11.200			517.440
	Stair -landing	2.000	5.500	1.500			16.500
		2.000	2.500	1.500			7.500
		2.000	3.100	1.500			9.300
	Step	2*25.000	1.500	0.300			22.500
	Deduct stair room roof	-1.000	4.800	11.200			-53.760
	Total						**519.480**
	FF roof slab						
	FF	1.000	46.200	11.200			517.440
	Stair -landing	2.000	5.500	1.500			16.500

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EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		2.000	2.500	1.500			7.500
		2.000	3.100	1.500			9.300
	Step	2*25.000	1.500	0.300			22.500
	rounding	1.000	7.280				7.280
	Total						**580.520**
						Total Quantity in sqm	**1100.000**
1.039	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	GF and FF lintels,sunshades, beams						
	GF lintels, sunshades-GF sunshade	1.000	112.000	0.900			100.800
	GF lintel all round	1.000	108.400	0.600			65.040
	locker and shop rooms front side	2.000	16.800	0.600			20.160
	do- cross wall	4.000	7.000	0.500			14.000
	do- long wall	4.000	16.800	0.500			33.600
	stair room	2.000	32.000	0.500			32.000
	Beams-GF 1	14.000	10.000	1.000			140.000
	GF 2	3.000	45.000	0.600			81.000
	FF lintels, sunshade-FF sunshade	1.000	112.000	0.900			100.800
	FF lintel all round	1.000	108.400	0.600			65.040
	lintel rooms front side	2.000	16.800	0.600			20.160
	do-cross wall	4.000	7.000	0.600			16.800
	do-long wall	1.000	16.800	0.600			10.080
	stair room	2.000	32.000	0.600			38.400
	Beams-FF 1	14.000	10.000	1.000			140.000
	FF 2	3.000	45.000	0.600			81.000
	Total						**958.880**
	Plinth beam						
	long wall	3*2	44.000		0.450		118.800
	cross wall	14*2*2	5.000		0.300		84.000
	rounding	1.000	0.320				0.320

EST No. :HED/CEHED/EST/105/2022_5_7_5 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**203.120**
						Total Quantity in sqm	**1162.000**
1.040	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	column						
	GF	3*14	1.500		3.100		195.300
	FF	3*14	1.300		3.100		169.260
	rounding	1.000	0.440		1.000		0.440
	Total						**365.000**
						Total Quantity in sqm	**365.000**
1.041	5.9.16.1						
	Centering and shuttering including strutting, etc. and removal of form for: Edges of slabs and breaks in floors and wallsUnder 20 cm wide						
	Roof edge						
	edge of slab	2.000	111.600				223.200
	rounding	1.000	1.800				1.800
	Total						**225.000**
						Total Quantity in metre	**225.000**

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Compound wall and side Protection works-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Truck bay**			
1.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	920.000cum	@210.02/cum	193218.40
1.002	OD1738/2022-2023			
	Coconut Pile - Supplying and stacking well matured straight coconut post for driving down through various strata bellow bed level including cost conveyance labor charges etc complete.			
	Net Total	10570.000metre	@136.76/metre	1445553.20
1.003	OD206/2022-2023			
	OD 6380 / 2020-2021 : Coconut Pile - Driving down coconut pile to lines and levels through soft to medium clay soil strata including all hire charges and labour and all other appliances necessary for pile driving down after pointing the bottom end. Details for one post of 6m long 15 numbers per day 6X15 = 90m Details for 90m length			
	Net Total	9060.000metre	@213.34/metre	1932860.40
1.004	60.64.6			
	Cutting and removing the excess length of wooden piles to lines and levels and removing the cut end of piles and stacking within 150m			
	Net Total	3020.000each	@191.17/each	577333.40
1.005	60.7.6			
	Supplying and stacking granite stone 20 to 45 dm3 for dumping works- Supplying at site of work granite stone 20 to 45 dm3 in size (60% 45m3,30%30 to 40dm3 and 10% 20 to 30dm3 stones) for measurement (deducting not less than 15% for voids as fixed by the departmental officer at site) including all cost, conveyance, loading and unloading charges all other incidental charges all leads and lifts etc. complete as per the direction of the departmental officers at site.			
	Net Total	3040.000cum	@1994.90/cum	6064496.00
1.006	60.7.7			
	Conveyance and dumping of departmental granite stones-Conveyance of departmental granite stone 20 to 45 dm3 in size from stack at site and dumping in			

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	position (60% 45m3,30%30 to 40dm3 and 10% 20 to 30dm3 stones) to lines and levels to from the core of the sea wall as per approved design including all leads and lifts etc. complete as per the direction of the departmental officers at site.			
	Net Total	3040.000cum	@605.23/cum	1839899.20
1.007	4.1.5			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	81.600cum	@7229.54/cum	589930.46
1.008	16.96			
	Providing & making Gabion structure with Mechanically Woven Double Twisted Hexagonal Shaped Wire mesh Gabion Boxes as per IS 16014:2012,MORTH Clause 2500, of required size, Mesh Type 10x12(D=100 mm with tolerance of ±2%), Zinic+10%Al alloy+PVC coated, Mesh wire diameter 2.7/3.7mm (ID/OD),mechanically edged/selvedged with partitions at every 1m interval and shall have minimum 10 numbersof openings per meter of mesh perpendicular to twist, tying with lacing wire of diameter2.2/3.2mm(ID/OD), supplied @3% by weight of Gabion boxes, filled with boulders with least dimension of 200 mm, as per drawing, all complete as per directions of Engineer-in-charge			
	Net Total	5130.000cum	@4735.18/cum	24291473.40
1.009	OD287/2022-2023			
	Laying of geotextile filter between pitching and embankment slopes on which pitching is laid to prevent escape of the embankment material through the voids of the stone pitching / cement concrete block as well as to allow free movements of water with out creating any uplift head on the pitching (OD approved by SE NC Order no D4 /179/2016/SE dt 23.2.2017 item no E4)and in price ID no 2017/928 			
	Net Total	4530.000sqm	@113.81/sqm	515559.30
1.010	4.1.6			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)			
	Net Total	81.600cum	@7076.05/cum	577405.68
1.011	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	305.072cum	@10858.36/cum	3312581.60
1.012	5.34.1			

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	305.072cum	@80.55/cum	24573.55
1.013	4.3.1			
	Centering and shuttering including strutting, propping etc. and removal of form work for:Foundations, footings, bases for columns			
	Net Total	834.270sqm	@329.03/sqm	274499.86
1.014	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	592.651cum	@7069.78/cum	4189912.19
1.015	OD288/2022-2023			
	Laterate masonry with neatly dressed laterate stone of size 30x20x20cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc. 			
	Net Total	321.235cum	@7872.96/cum	2529070.31
1.016	OD5538/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - HCR			
	Net Total	17332.880kilogram	@96.62/kilogram	1674702.87
1.017	13.1.2			
	12 mm cement plaster of mix:1:6 (1 cement : 6 fine sand).			
	Net Total	4093.500sqm	@293.67/sqm	1202138.15
1.018	13.43.1			
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer			
	Net Total	4093.500sqm	@69.33/sqm	283802.36
1.019	13.44.1			
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)			
	Net Total	4093.500sqm	@105.36/sqm	431291.16
	Heading Total(Rs)			51950301.49
	Total Estimation PAC			51950301.49
3	**Extra Charges**			

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
2.001	Provision for GST			
		51950301.49	18.00%	9351054.27
			Grand Total	61301355.76
			Round off	98644.24
			Rounded Total(Rs)	61400000.00
	Rupees Six Crore Fourteen Lakh			

ePRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Compound wall and side Protection works-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Truck bay						
1.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	Excavation						
	for compound wall near main break water to entrance gate	1.000	67.000	0.800	0.800		42.880
	from entrance gate to lee ward break water	1.000	440.000	0.800	0.800		281.600
	for side protection , East side of river training	1.000	485.000	2.400	0.300		349.200
	for side protection , west of river training	1.000	205.000	2.400	0.300		147.600
	for side protection , west of river training	1.000	120.000	2.400	0.300		86.400
	Rounding qty	1.000	12.320	1.000	1.000		12.320
	Total						**920.000**
						Total Quantity in cum	**920.000**
1.002	OD1738/2022-2023						
	Coconut Pile - Supplying and stacking well matured straight coconut post for driving down through various strata bellow bed level including cost conveyance labor charges etc complete.						
	For Gabion box at 1m interval						
	Side protection wall near east side of river training	2*485	3.500			1.000000	3395.000
	_do_ (west)	2*205	3.500			1.000000	1435.000

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	_do_ (west)	2*120	3.500			1.000000	840.000
	Basin boundary between main and leeward break water	2*600	3.500			1.000000	4200.000
	Basin boundary near leeward break water	2*100	3.500			1.000000	700.000
	Total						**10570.000**
						Total Quantity in metre	**10570.000**
1.003	OD206/2022-2023						
	OD 6380 / 2020-2021 : Coconut Pile - Driving down coconut pile to lines and levels through soft to medium clay soil strata including all hire charges and labour and all other appliances necessary for pile driving down after pointing the bottom end. Details for one post of 6m long 15 numbers per day 6X15 = 90m Details for 90m length						
	coconut pile						
	Side protection wall near east side of river training	2*485	3.000			1.000000	2910.000
	_do_ (west)	2*205	3.000			1.000000	1230.000
	_do_ (west)	2*120	3.000			1.000000	720.000
	Basin boundary between main and leeward break water	2*600	3.000			1.000000	3600.000
	Basin boundary near leeward break water	2*100	3.000			1.000000	600.000
	Total						**9060.000**
						Total Quantity in metre	**9060.000**
1.004	60.64.6						
	Cutting and removing the excess length of wooden piles to lines and levels and removing the cut end of piles and stacking within 150m						
	excess length cutting						
	Side protection wall near east side of river training	2*485				1.000000	970.000

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	_do_ (west)	2*205				1.000000	410.000
	_do_ (west)	2*120				1.000000	240.000
	Basin boundary between main and leeward break water	2*600				1.000000	1200.000
	Basin boundary near leeward break water	2*100				1.000000	200.000
	Total						**3020.000**
						Total Quantity in each	**3020.000**
1.005	60.7.6						
	Supplying and stacking granite stone 20 to 45 dm3 for dumping works- Supplying at site of work granite stone 20 to 45 dm3 in size (60% 45m3,30%30 to 40dm3 and 10% 20 to 30dm3 stones) for measurement (deducting not less than 15% for voids as fixed by the departmental officer at site) including all cost, conveyance, loading and unloading charges all other incidental charges all leads and lifts etc. complete as per the direction of the departmental officers at site.						
	side protection wall						
	for side protection , East side of river training	1.000	485.000	2.400	0.450		523.800
	for side protection , west of river training	1.000	205.000	2.400	0.450		221.400
	for side protection , west of river training	1.000	120.000	2.400	0.450		129.600
	Basin boundary between main and leeward break water	1.000	600.000	2.400	1.000	1.000000	1440.000
	Basin boundary near leeward break water	1.000	300.000	2.400	1.000	1.000000	720.000
	roundig	5.200					5.200
	Total						**3040.000**
						Total Quantity in cum	**3040.000**
1.006	60.7.7						

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Conveyance and dumping of departmental granite stones-Conveyance of departmental granite stone 20 to 45 dm3 in size from stack at site and dumping in position (60% 45m3,30%30 to 40dm3 and 10% 20 to 30dm3 stones) to lines and levels to from the core of the sea wall as per approved design including all leads and lifts etc. complete as per the direction of the departmental officers at site.						
	for side protection wall						
	for side protection , East side of river training	1.000	485.000	2.400	0.450		523.800
	for side protection , west of river training	1.000	205.000	2.400	0.450		221.400
	for side protection , west of river training	1.000	120.000	2.400	0.450		129.600
	Basin boundary between main and leeward break water	1.000	600.000	2.400	1.000	1.000000	1440.000
	Basin boundary near leeward break water	1.000	300.000	2.400	1.000	1.000000	720.000
	rounding	1.000	5.200			1.000000	5.200
	Total						**3040.000**
						Total Quantity in cum	**3040.000**
1.007	4.1.5						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	foundation footing						
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.800	0.200		11.200
	from entrance gate to lee ward breakwater	1.000	440.000	0.800	0.200		70.400
	Total						**81.600**
						Total Quantity in cum	**81.600**
1.008	16.96						

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing & making Gabion structure with Mechanically Woven Double Twisted Hexagonal Shaped Wire mesh Gabion Boxes as per IS 16014:2012,MORTH Clause 2500, of required size, Mesh Type 10x12(D=100 mm with tolerance of ±2%), Zinic+10%Al alloy+PVC coated, Mesh wire diameter 2.7/3.7mm (ID/OD),mechanically edged/selvedged with partitions at every 1m interval and shall have minimum 10 numbersof openings per meter of mesh perpendicular to twist, tying with lacing wire of diameter2.2/3.2mm(ID/OD), supplied @3% by weight of Gabion boxes, filled with boulders with least dimension of 200 mm, as per drawing, all complete as per directions of Engineer-in-charge						
	gabion box						
	Side protection wall near east side of river training	1.000	485.000	2.000	1.000	1.000000	970.000
		1.000	485.000	1.000	1.000	1.000000	485.000
	_do_ (west)	1.000	205.000	2.000	1.000	1.000000	410.000
		1.000	205.000	1.000	1.000	1.000000	205.000
	_do_ (west)	1.000	120.000	2.000	1.000	1.000000	240.000
		1.000	120.000	1.000	1.000	1.000000	120.000
	Basin boundary between main and leeward break water	1.000	600.000	2.000	1.000	1.000000	1200.000
		1.000	600.000	1.000	1.000	1.000000	600.000
	Basin boundary near leeward break water	1.000	300.000	2.000	1.000	1.000000	600.000
		1.000	300.000	1.000	1.000	1.000000	300.000
	Total						**5130.000**
						Total Quantity in cum	**5130.000**
1.009	OD287/2022-2023						
	Laying of geotextile filter between pitching and embankment slopes on which pitching is laid to prevent escape of the embankment material through the voids of the stone pitching / cement concrete block as well as to allow free movements of water with out creating any uplift head on the pitching (OD approved by SE NC Order no D4 /179/2016/SE dt 23.2.2017 item no E4)and in price ID no 2017/928 						
	geotextile						

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Side protection wall near east side of river training	1.000	485.000		3.000	1.000000	1455.000
	_do_ (west)	1.000	205.000		3.000	1.000000	615.000
	_do_ (west)	1.000	120.000		3.000	1.000000	360.000
	Basin boundary between main and leeward break water	1.000	600.000		3.000	1.000000	1800.000
	Basin boundary near leeward break water	1.000	100.000		3.000	1.000000	300.000
	Total						**4530.000**
						Total Quantity in sqm	**4530.000**
1.010	4.1.6						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)						
	cement concrete						
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.800	0.200		11.200
	from entrance gate to lee ward breakwater	1.000	440.000	0.800	0.200		70.400
	Total						**81.600**
						Total Quantity in cum	**81.600**
1.011	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	coping						

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.350	0.075		1.838
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.350	0.075/2		0.919
	from entrance gate to lee ward breakwater	1.000	440.000	0.350	0.075		11.550
	from entrance gate to lee ward breakwater	1.000	440.000	0.350	0.075/2		5.775
	sideprotectioneast of river training work	1.000	485.000	0.350	0.075	1.000000	12.731
	sideprotectioneast of river training work	1.000	485.000	0.350	0.075/2	1.000000	6.366
	Butress wall at 3.6 m intervals	276.000	0.550	0.550	0.075	1.000000	6.262
	Butress wall at 3.6 m intervals	276.000	0.550	0.550	0.075/2	1.000000	3.131
	Total						**48.572**
	belt over gabion box						
	sideprotectioneast of river training work	1.000	485.000	1.000	0.150	1.000000	72.750
	do west	1.000	205.000	1.000	0.150	1.000000	30.750
	do	1.000	120.000	1.000	0.150	1.000000	18.000
	basin boundary between main and leeward	1.000	600.000	1.000	0.150	1.000000	90.000
	near leeward breakwater	1.000	300.000	1.000	0.150	1.000000	45.000
	Total						**256.500**
						Total Quantity in cum	**305.072**
1.012	5.34.1						

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	coping						
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.350	0.075		1.838
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.350	0.075/2		0.919
	from entrance gate to lee ward breakwater	1.000	440.000	0.350	0.075		11.550
	from entrance gate to lee ward breakwater	1.000	440.000	0.350	0.075/2		5.775
	sideprotectioneast of river training work	1.000	485.000	0.350	0.075	1.000000	12.731
	sideprotectioneast of river training work	1.000	485.000	0.350	0.075/2	1.000000	6.366
	Butress wall at 3.6 m intervals	276.000	0.550	0.550	0.075	1.000000	6.262
	Butress wall at 3.6 m intervals	276.000	0.550	0.550	0.075/2	1.000000	3.131
	Total						**48.572**
	belt over gabion box						
	sideprotectioneast of river training work	1.000	485.000	1.000	0.150	1.000000	72.750
	do west	1.000	205.000	1.000	0.150	1.000000	30.750
	do	1.000	120.000	1.000	0.150	1.000000	18.000
	basin boundary between main and leeward	1.000	600.000	1.000	0.150	1.000000	90.000
	near leeward breakwater	1.000	300.000	1.000	0.150	1.000000	45.000
	Total						**256.500**

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**305.072**
1.013	4.3.1						
	Centering and shuttering including strutting, propping etc. and removal of form work for:Foundations, footings, bases for columns						
	shuttering work						
	sideprotectioneast of river training work	2.000	485.000		0.150	1.000000	145.500
	do west	2.000	205.000		0.150	1.000000	61.500
	do	2.000	120.000		0.150	1.000000	36.000
	basin boundary between main and leeward	2.000	600.000		0.150	1.000000	180.000
	near leeward breakwater	2.000	300.000		0.150	1.000000	90.000
	Total						**513.000**
	for coping						
	for compound wall over land ,from auction hall area to entrance gate	2.000	70.000		0.150		21.000
	from entrance gate to lee ward breakwater	2.000	440.000		0.150		132.000
	sideprotectioneast of river training work	2.000	485.000		0.150	1.000000	145.500
	Butress wall at 3.6 m intervals	276.000	0.550		0.150	1.000000	22.770
	Total						**321.270**
						Total Quantity in sqm	**834.270**
1.014	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	RR						
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.600	0.600		25.200

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.450	0.450		14.175
	from entrance gate to lee ward breakwater	1.000	440.000	0.600	0.600		158.400
	for compound wall over land ,from auction hall area to entrance gate	1.000	440.000	0.450	0.450		89.100
	side protection east of river training work	1.000	485.000	0.450	0.450	1.000000	98.213
	do west	1.000	205.000	0.450	0.450	1.000000	41.513
	do	1.000	120.000	0.450	0.450	1.000000	24.300
	basin boundary between main and leeward	1.000	600.000	0.450	0.450	1.000000	121.500
	near leeward breakwater	1.000	100.000	0.450	0.450	1.000000	20.250
	Total						**592.651**
						Total Quantity in cum	**592.651**
1.015	OD288/2022-2023						
	Laterate masonry with neatly dressed laterate stone of size 30x20x20cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc. 						
	laterite masonry						
		1.000					1.000
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.200	1.500		21.000
	from entrance gate to lee ward breakwater	1.000	440.000	0.200	1.500		132.000
	sideprotectioneast of river training work	1.000	485.000	0.200	1.500	1.000000	145.500
	Butress wall at 3.6 m intervals	276.000	0.350	0.150	1.500	1.000000	21.735

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**321.235**
						Total Quantity in cum	**321.235**
1.016	OD5538/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - HCR						
	Steel						
	LS Wt taken as 40kg/m3 for item no 11	1.000	48.572			40.000000	1942.880
	LS Wt taken as 60kg/m3 for item no 11 belt	1.000	256.500			60.000000	15390.000
	Total						**17332.880**
						Total Quantity in kilogram	**17332.880**
1.017	13.1.2						
	12 mm cement plaster of mix:1:6 (1 cement : 6 fine sand).						
	plastering						
	for compound wall over land ,from auction hall area to entrance gate	2.000	70.000		1.500		210.000
	from entrance gate to lee ward breakwater	2.000	440.000		1.500		1320.000
	sideprotectioneast of river training work	2.000	485.000		1.500	1.000000	1455.000
	Butress wall at 3.6 m intervals	276.000	0.500		1.500	1.000000	207.000
	Total						**3192.000**
	plastering over coping						
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.750			52.500
	from entrance gate to lee ward breakwater	1.000	440.000	0.750			330.000
	sideprotectioneast of river training work	1.000	485.000	0.750		1.000000	363.750

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Butress wall at 3.6 m intervals	276.000	0.750	0.750		1.000000	155.250
	Total						**901.500**
						Total Quantity in sqm	**4093.500**
1.018	13.43.1						
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	primer						
	for compound wall over land ,from auction hall area to entrance gate	2.000	70.000		1.500		210.000
	from entrance gate to lee ward breakwater	2.000	440.000		1.500		1320.000
	sideprotectioneast of river training work	2.000	485.000		1.500	1.000000	1455.000
	Butress wall at 3.6 m intervals	276.000	0.500		1.500	1.000000	207.000
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.750			52.500
	from entrance gate to lee ward breakwater	1.000	440.000	0.750			330.000
	sideprotectioneast of river training work	1.000	485.000	0.750		1.000000	363.750
	Butress wall at 3.6 m intervals	276.000	0.750	0.750		1.000000	155.250
	Total						**4093.500**
						Total Quantity in sqm	**4093.500**
1.019	13.44.1						
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)						
	painting						
	for compound wall over land ,from auction hall area to entrance gate	2.000	70.000		1.500		210.000

EST No. :HED/CEHED/EST/105/2022_5_6_3 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	from entrance gate to lee ward breakwater	2.000	440.000		1.500		1320.000
	sideprotectioneast of river training work	2.000	485.000		1.500	1.000000	1455.000
	Butress wall at 3.6 m intervals	276.000	0.500		1.500	1.000000	207.000
	for compound wall over land ,from auction hall area to entrance gate	1.000	70.000	0.750			52.500
	from entrance gate to lee ward breakwater	1.000	440.000	0.750			330.000
	sideprotectioneast of river training work	1.000	485.000	0.750		1.000000	363.750
	Butress wall at 3.6 m intervals	276.000	0.750	0.750		1.000000	155.250
	Total						**4093.500**
						Total Quantity in sqm	**4093.500**

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasargod District- Construction of Gate and Gate House-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Gate and Gate house**			
1.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	50.000cum	@210.02/cum	10501.00
1.002	2.26.1			
	Extra for every additional lift 1.5 m or part there of in excavation / banking excavated or stacked materials.All kinds of soil			
	Net Total	2.250cum	@104.39/cum	234.88
1.003	2.16.1			
	Close timbering in trenches including strutting, shoring and packing cavities (wherever required) complete (Measurements to be taken of the face area timbered).Depth not exceeding 1.5m			
	Net Total	18.000sqm	@150.11/sqm	2701.98
1.004	OD1742/2022-2023			
	Bailing out water Using 5HP Pump- Bailing out water with 5HP engine and pump set including conveyance to site and erection, cost of fuel, lubrication oil and other stores, pay of staff etc complete			
	Net Total	50.000hour	@372.81/hour	18640.50
1.005	60.7.2			
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.			
	Net Total	10.000cum	@2557.65/cum	25576.50
1.006	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	20.000cum	@6687.21/cum	133744.20
1.007	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			

File No. HECE/207/2022-DR8 (Computer No. 19397)

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EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	15.000cum	@7069.78/cum	106046.70
1.008	OD308/2022-2023			
	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. All work upto plinth level 			
	Net Total	3.676cum	@9317.74/cum	34252.01
1.009	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	11.040sqm	@329.03/sqm	3632.49
1.010	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	35.040sqm	@847.44/sqm	29694.30
1.011	OD309/2022-2023			
	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. All work above plinth level upto floor V level 			
	Net Total	12.071cum	@10938.91/cum	132043.58
1.012	5.22.6			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - Mechanically Treated bars of grade Fe-500D or more			
	Net Total	313.520kilogram	@96.46/kilogram	30242.14
1.013	5.22A.6			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - Mechanically Treated bars of grade Fe-500D or more			
	Net Total	1509.740kg	@96.46/kg	145629.52
1.014	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	51.388sqm	@637.63/sqm	32766.53
1.015	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	36.476sqm	@800.47/sqm	29197.94
1.016	5.9.16.1			
	Centering and shuttering including strutting, etc. and removal of form for: Edges of slabs and breaks in floors and wallsUnder 20 cm wide			
	Net Total	63.600metre	@200.11/metre	12727.00
1.017	50.6.1.5			
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x20cm or nearest available size confirming to IS 2185 Part I of 1979 for super structure up to floor two level thickness 20cm and above in: CM 1:6 (1 cement : 6 coarse sand) etc complete			
	Net Total	10.488cum	@6580.80/cum	69019.43
1.018	9.48.2			
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc			
	Net Total	86.725kg	@211.94/kg	18380.50
1.019	9.117.2			
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 42x50 mm			
	Net Total	10.400metre	@308.89/metre	3212.46
1.020	9.118.1			
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).			

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	4.200sqm	@2033.68/sqm	8541.46
1.021	5.23			
	Smooth finishing of the exposed surface of RCC work with 6mm thick cement mortar 1:3 (cement : 3 fine sand).			
	Net Total	136.364sqm	@262.57/sqm	35805.10
1.022	13.1.1			
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	66.000sqm	@308.22/sqm	20342.52
1.023	11.41.2			
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.			
	Net Total	15.440sqm	@1733.20/sqm	26760.61
1.024	13.48.1			
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm			
	Net Total	85.676sqm	@164.22/sqm	14069.71
1.025	13.47.1			
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)			
	Net Total	137.736sqm	@186.15/sqm	25639.56
1.026	13.52.1			
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work			
	Net Total	30.880sqm	@219.17/sqm	6767.97
1.027	9.97.2			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:250x10 mm			
	Net Total	2.000no	@119.63/no	239.26
1.028	9.100.2			
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm			
	Net Total	2.000no	@61.02/no	122.04

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
1.029	12.47.1			
	Providing & fixing UV stabilised fibre glass reinforced plastic sheet rooting up to any pitch, including fixing with polymer coated 'J' or 'L' hooks, bolts & nuts 8 mm dia G.I plain/ bitumen washers complete but excluding the cost of purlins, rafters, trusses etc. The sheets shall be manufactured out of 2400 TEX panel rovings incorporating minimum 0.3% ultra-violet stabiliser in resin system under approxirnately 2400 psi and hot cured. They shall be of uniform pigmentation and thickness without air pockets and shall conform to IS 10192 and IS 12866. The sheets shall be opaque or translucent, clear or pigmented, textured or smooth as specified.2 mm thick corrugate 2.5"or 4.2" or 6") or step-down (2' or 3" or 6") as specified.			
	Net Total	15.428sqm	@1265.03/sqm	19516.88
1.030	10.25.2			
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works			
	Net Total	128.339kg	@151.29/kg	19416.41
1.031	21.1.1.3			
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionPolyester powder coated aluminium (minimum thickness of polyester powder coating 50 micron)			
	Net Total	69.972kg	@536.75/kg	37557.47
1.032	21.1.2.3			
	For shutters of doors, windows & ventilators including providing and fixing hinges / pivots and making provision for fixing of fittings wherever required including the cost of EPDM rubber/ neoprene gasket required (Fittings shall be paid for separately)Polyester powder coated aluminium (minimum thickness of polyester powder coating 50 micorn)			
	Net Total	83.116kg	@641.01/kg	53278.19
1.033	21.3.1			
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 4.0 mm thickness			

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	7.110sqm	@1154.59/sqm	8209.13
1.034	8.2.2.2			
	Providing and fixing 18 mm thick gang saw cut, mirror, polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations, of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.Area of slab over 0.50 sqm			
	Net Total	71.625sqm	@4629.02/sqm	331553.56
			Heading Total(Rs)	1446063.53
			Total Estimation PAC	1446063.53
3	**Extra Charges**			
2.001	Provision for GST			
		1446063.53	18.00%	260291.44
			Grand Total	1706354.97
			Round off	93645.03
			Rounded Total(Rs)	1800000.00
	Rupees Eighteen Lakh			

e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasargod District- Construction of Gate and Gate House-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Gate and Gate house						
1.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	gate & gate house						
	For main pillars	2.000	1.500	1.500	2.000		9.000
	For side pillars	2.000	1.200	1.200	1.500		4.320
	For walls	2.000	10.400	0.900	1.100		20.592
	Steps	2.000	2.800	0.450	0.300		0.756
	Wicket gate	2.000	3.140	(.9*.9)/4	0.300		0.382
	Building floor (All round)	2.000	17.200	1.500	0.150		7.740
	Gate portion	1.000	4.000	5.800	0.150		3.480
	rounding	1.000	3.730				3.730
	Total						**50.000**
						Total Quantity in cum	**50.000**
1.002	2.26.1						
	Extra for every additional lift 1.5 m or part there of in excavation / banking excavated or stacked materials.All kinds of soil						
	gate house						
	For main pillars	2.000	1.500	1.500	0.500		2.250
	Total						**2.250**
						Total Quantity in cum	**2.250**
1.003	2.16.1						
	Close timbering in trenches including strutting, shoring and packing cavities (wherever required) complete (Measurements to be taken of the face area timbered).Depth not exceeding 1.5m						
	gate house						
	For main pillars	2.000	6.000		1.500		18.000
	Total						**18.000**
						Total Quantity in sqm	**18.000**
1.004	OD1742/2022-2023						

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Bailing out water Using 5HP Pump- Bailing out water with 5HP engine and pump set including conveyance to site and erection, cost of fuel, lubrication oil and other stores, pay of staff etc complete						
	For Gate and Gate House						
	Pumping required for 10 hrs with 5 hp pump set	5.000	10.000			1.000000	50.000
	Total						**50.000**
						Total Quantity in hour	**50.000**
1.005	60.7.2						
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.						
	Gate and gate house						
	For main pillars	2.000	1.500	1.500	0.300		1.350
	For side pillars	2.000	1.200	1.200	0.300		0.864
	For walls	2.000	10.400	0.900	0.300		5.616
	Steps	2.000	2.800	0.450	0.200		0.504
	rounding	1.000	1.666				1.666
	Total						**10.000**
						Total Quantity in cum	**10.000**
1.006	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	pcc						
	For main pillars	2.000	1.500	1.500	0.150		0.675
	For side pillars	2.000	1.200	1.200	0.150		0.432
	For walls	2.000	10.400	0.900	0.150		2.808
	Steps	2.000	2.800	0.450	0.100		0.252
	room inside	2.000	2.400	2.400	0.120		1.382
	Wicket gate	2.000	3.140	(.9*.9)/4	0.300		0.382
	Building floor (All round)	2.000	17.200	1.500	0.150		7.740
	Gate portion	1.000	4.000	5.800	0.150		3.480
	rounding	1.000	2.849				2.849
	Total						**20.000**
						Total Quantity in cum	**20.000**
1.007	7.1.1						

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	gate house						
	For walls-Foundation	2.000	10.400	0.600	0.600		7.488
	For walls-Basement	2.000	10.400	0.450	0.450		4.212
	Steps	2.000	2.800	0.450	0.200		0.504
	rounding	1.000	2.796				2.796
	Total						**15.000**
						Total Quantity in cum	**15.000**
1.008	OD308/2022-2023						
	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. All work upto plinth level 						
	Column Footing of Gate House						
	For main pillars	2.000	1.500	1.500	0.200		0.900
	For side pillars	2.000	1.200	1.200	0.200		0.576
	For main pillars - f r u s t u m 0 . 4 / 3 (A 1 + A 2) + s q . r o o t of(A1xA2) = A1 = 1.5x1.5 = 2.25, A2 = 1x0.40 = 0.40 = sq.root (A1xA2) = sq.root(2.25 x 0.40) = 0 . 9 5 2x0.4/3x(2.25+0.4+0.9 5)=0.96	2.000	0.133	3.600			0.958
	For main pillars	2.000	0.900	0.300	0.950		0.513
	For side pillars	2.000	0.900	0.300	0.450		0.243
	Total						**3.190**
	Columns upto plinth level						
	For main pillars	2.000	0.900	0.300	0.450		0.243
	For side pillars	2.000	0.900	0.300	0.450		0.243

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**0.486**
						Total Quantity in cum	**3.676**
1.009	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	gate house column footing						
	For main pillars	2.000	(0.9+0.3) *2		0.950		4.560
	For side pillars	2.000	(0.9+0.3) *2		0.450		2.160
	Total						**6.720**
	Gate (Columns upto plinth level)						
	For main pillars	2.000	(.9+.3)*2		0.450		2.160
	For side pillars	2.000	(.9+.3)*2		0.450		2.160
	Total						**4.320**
						Total Quantity in sqm	**11.040**
1.010	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	For column above plinth level						
	Upto roof slab	2.000	2.400		4.250		20.400
	Top portion of Pillar	2.000	4.000		0.300		2.400
	For side pillars	2.000	2.400		2.550		12.240
	Total						**35.040**
						Total Quantity in sqm	**35.040**
1.011	OD309/2022-2023						
	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. All work above plinth level upto floor V level 						
	lintel						
	lintel over wall	2.000	10.400	0.200	0.150		0.624
	Total						**0.624**
	Roof slab						
	Sloped roof	2*2	3.700	2.180	0.100		3.226
	Parallel portion	2*2	0.900	1.170	0.100		0.421

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**3.647**
	Purgola						
	Purgola	4.000	7.400	0.200	0.600		3.552
	Purgola	5*3	0.200	0.300	0.300		0.270
	Total						**3.822**
	For column above plinth level						
	Upto roof slab	2.000	0.900	0.300	4.250		2.295
	Top portion of Pillar	2.000	1.700	0.300	0.300		0.306
	For side pillars	2.000	0.900	0.300	2.550		1.377
	Total						**3.978**
						Total Quantity in cum	**12.071**
1.012	5.22.6						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - Mechanically Treated bars of grade Fe-500D or more						
	steel						
	Column footing of gate house @ 80kg per m3	1.000	3.190			80.000000	255.200
	For column up to plinth level @ 120kg/m3 for item No.8	1.000	0.486			120.000000	58.320
	Total						**313.520**
						Total Quantity in kilogram	**313.520**
1.013	5.22A.6						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - Mechanically Treated bars of grade Fe-500D or more						
	Steel						
	For column above plinth level @ 160kg/m3	1.000	3.978			160.000000	636.480
	Lintel over wall @ 80kg/m3	1.000	0.624			80.000000	49.920
	Roof slab @100kg/m3	1.000	3.647			100.000000	364.700
	Purgolas @ 120kg/m3	1.000	3.822			120.000000	458.640
	Total						**1509.740**

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in kg	**1509.740**
1.014	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	lintel						
	lintel over wall	2.000	10.280			0.300000	6.168
	Total						**6.168**
	Purgola						
	Purgola	4.000	7.400	1.400			41.440
		7*3	0.200	0.900			3.780
	Total						**45.220**
						Total Quantity in sqm	**51.388**
1.015	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Roof slab						
	Sloped roof	2*2	3.700	2.180			32.264
	Parallel portion	2*2	0.900	1.170			4.212
	Total						**36.476**
						Total Quantity in sqm	**36.476**
1.016	5.9.16.1						
	Centering and shuttering including strutting, etc. and removal of form for: Edges of slabs and breaks in floors and wallsUnder 20 cm wide						
	Roof slab edge						
	Sloped roof	2*2	(3.700+2.18)*2				47.040
	Parallel portion	2*2	(.9+1.17)*2				16.560
	Total						**63.600**
						Total Quantity in metre	**63.600**
1.017	50.6.1.5						
	Solid block masonry using pre cast solid blocks (Factory made) of size 30x20x20cm or nearest available size confirming to IS 2185 Part I of 1979 for super structure up to floor two level thickness 20cm and above in: CM 1:6 (1 cement : 6 coarse sand) etc complete						
	gate house						
	Super structure	2.000	10.400	0.200	3.000		12.480
	Total						**12.480**
	deductions						

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Doors	-2.000	1.000	0.200	2.100		-0.840
	windows	-3.000	1.000	0.200	1.400		-0.840
	Lintel	-1.000	10.400	0.200	0.150		-0.312
	Total						**-1.992**
						Total Quantity in cum	**10.488**
1.018	9.48.2						
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc						
	Details for 1.08 sqm						
	Window W,MS bar 16mm dia,1.58kg/m	2.000	1.000	1.400		15.231000	42.647
	Front gate,M.S. flat 2 5 x 3 . 1 5 m m , @ 0 . 6 3 k g / m	1.000	7.000	1.700		3.704000	44.078
	Total						**86.725**
						Total Quantity in kg	**86.725**
1.019	9.117.2						
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 42x50 mm						
	door						
	D	2.000	5.200				10.400
	Total						**10.400**
						Total Quantity in metre	**10.400**
1.020	9.118.1						

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).						
	Door						
	D	2.000	1.000		2.100		4.200
	Total						**4.200**
						Total Quantity in sqm	**4.200**
1.021	5.23						
	Smooth finishing of the exposed surface of RCC work with 6mm thick cement mortar 1:3 (cement : 3 fine sand).						
	Purgola						
	Purgola	4.000	7.000	1.600			44.800
	Purgola	5*3	0.200	1.200			3.600
	Total						**48.400**
	pillars						
	For side pillars	2.000	2.400	2.550			12.240
	For main pillar Top	2.000	1.700	0.300			1.020
	-d0- head	2.000	4.000	0.300			2.400
	For main pillars	2.000	2.400	4.250			20.400
	Total						**36.060**
	ceiling						
	ceiling	1.000	7.600	2.030			15.428
		2*2	3.700	2.180			32.264
		2*2	0.900	1.170			4.212
	Total						**51.904**
						Total Quantity in sqm	**136.364**
1.022	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	plastering						

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	inside wall	2.000	9.600		3.000		57.600
	Outer wall (remaining granite portion)	2.000	2.800		3.000		16.800
	Total						**74.400**
	deductions						
	door	-2.000	1.000		2.100		-4.200
	window	-3.000	1.000		1.400		-4.200
	Total						**-8.400**
						Total Quantity in sqm	**66.000**
1.023	11.41.2						
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.						
	flooring						
	room-floor	2.000	2.400	2.400			11.520
	steps	2.000	2.800	0.700			3.920
	Total						**15.440**
						Total Quantity in sqm	**15.440**
1.024	13.48.1						
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm						
	Gate house and roof (inside)						
	Inside wall	2.000	9.600	3.000			57.600
	Sloped roof (inside)	2*2	3.700	2.180			32.264
	Parallel portion (inside)	4.000	0.900	1.170			4.212
	Total						**94.076**
	deductions						
	Door	-2.000	1.000		2.100		-4.200
	window	-3.000	1.000		1.400		-4.200
	Total						**-8.400**
						Total Quantity in sqm	**85.676**
1.025	13.47.1						

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)						
	outer side						
	Outer Wall (remaining granite portion)	2.000	2.800	3.000			16.800
	Purgolas	4.000	7.000	1.600			44.800
		5*3	0.200	1.200			3.600
	Total						**65.200**
	Pillars						
	For side pillars	2.000	2.400	2.550			12.240
	For main pillar Top	2.000	1.700	0.300			1.020
	-d0- head	2.000	4.000	0.300			2.400
	For main pillars	2.000	2.400	4.250			20.400
	Total						**36.060**
	roof						
	sloped roof(out side)	2*2	3.700	2.180			32.264
		2*2	0.900	1.170			4.212
	Total						**36.476**
						Total Quantity in sqm	**137.736**
1.026	13.52.1						
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work						
	painting						
	window	3.000	1.000	1.400			4.200
	Front gate	2.000	7.000	1.700			23.800
	Wicket gate	2*4	0.400	0.900			2.880
	Total						**30.880**
						Total Quantity in sqm	**30.880**
1.027	9.97.2						
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:250x10 mm						
	250x10mm tower bolt						
		2.000					2.000
	Total						**2.000**

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in no	**2.000**
1.028	9.100.2						
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm						
	Al handle 100mm with plate 150mm x32mm						
		2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.029	12.47.1						
	Providing & fixing UV stabilised fibre glass reinforced plastic sheet rooting up to any pitch, including fixing with polymer coated 'J' or 'L' hooks, bolts & nuts 8 mm dia G.I plain/ bitumen washers complete but excluding the cost of purlins, rafters, trusses etc. The sheets shall be manufactured out of 2400 TEX panel rovings incorporating minimum 0.3% ultra-violet stabiliser in resin system under approxirnately 2400 psi and hot cured. They shall be of uniform pigmentation and thickness without air pockets and shall conform to IS 10192 and IS 12866. The sheets shall be opaque or translucent, clear or pigmented, textured or smooth as specified.2 mm thick corrugate 2.5"or 4.2" or 6") or step-down (2' or 3" or 6") as specified.						
	Details of cost for area of roof 2x18.09x5.1 = 184.518 sqm						
	Purgola roof	1.000	7.600	2.030			15.428
	Total						**15.428**
						Total Quantity in sqm	**15.428**
1.030	10.25.2						
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works						
	gate						
	Front gate - 33.6@ (14.5+.084)/2 kg/m	2.000	7.000		(14.5+.084)/2		102.088
	Wicket gate	4.000	0.900		(14.5+.084)/2		26.251
	Total						**128.339**
						Total Quantity in kg	**128.339**
1.031	21.1.1.3						

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionPolyester powder coated aluminium (minimum thickness of polyester powder coating 50 micron)						
	Aluminium work						
	Door D-Weight @ 8.33kg/m2	2.000	1.000	2.100	8.330		34.986
	Al window	3.000	1.000	1.400	8.330		34.986
	Total						**69.972**
						Total Quantity in kg	**69.972**
1.032	21.1.2.3						
	For shutters of doors, windows & ventilators including providing and fixing hinges / pivots and making provision for fixing of fittings wherever required including the cost of EPDM rubber/ neoprene gasket required (Fittings shall be paid for separately)Polyester powder coated aluminium (minimum thickness of polyester powder coating 50 micorn)						
	shutters						
	Door D Weight @ 11.69kg/m	2.000	0.900	2.000	11.690		42.084
	Area of aluminium windows @11.69 kg/m	3.000	0.900	1.300	11.690		41.032
	Total						**83.116**
						Total Quantity in kg	**83.116**
1.033	21.3.1						
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 4.0 mm thickness						
	shutters						
	Area of aluminium door shutters	2.000	0.900	2.000			3.600
	Area of aluminium window shutters	3.000	0.900	1.300			3.510

EST No. :HED/CEHED/EST/105/2022_5_5_2 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**7.110**
						Total Quantity in sqm	**7.110**
1.034	8.2.2.2						
	Providing and fixing 18 mm thick gang saw cut, mirror, polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations, of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.Area of slab over 0.50 sqm						
	gate house						
	Out side walls of ATM counter	3.000	2.800	3.000			25.200
	Out side walls of toll booth	3.000	2.800	3.000			25.200
	Compound wall front	2.000	10.000	1.200			24.000
	Name board	1.000	7.500	0.750			5.625
	Total						**80.025**
	deductions						
	Door	-2.000	1.000		2.100		-4.200
	window	-3.000	1.000		1.400		-4.200
	Total						**-8.400**
						Total Quantity in sqm	**71.625**

EST No. :HED/CEHED/EST/105/2022_5_3_6 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Construction of Internal Road, Parking area and Drainage facility-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Concrete road & drainage work**			
1.001	3.15.2			
	Compacting Original Ground (ii) Compacting original ground supporting subgrade Loosening of the ground upto a level of 300 mm below the subgrade level, watered, graded and compacted in layers to meet requirement of Tables 300.1 and 300.2 for subgrade construction as per Technical Specification Clause 303.5.2.			
	Net Total	3270.000cum	@62.02/cum	202805.40
1.002	3.2			
	Preparation of Foundation for Embankment Scarifying Existing Bituminous Surface to a Depth of 150 mm by Mechanical Means Scarifying the existing bituminous road surface to a depth of 150 mm and disposal of scarified material with a lift upto 3 m and lead upto 1000 m as per Technical Specification Clause 301.4.			
	Net Total	1200.000sqm	@9.63/sqm	11556.00
1.003	11.1.1.1			
	Excavation for Structures Earthwork in excavation for structures as per drawing and technical specifications Clause 305.1 including setting out, construction of shoring and bracing, removal of stumps and other deleterious material and disposal upto a lead of 50 m, dressing of sides and bottom and backfilling in trenches with excavated suitable material. I. Ordinary soil (i) Upto 3 m depth			
	Net Total	275.400cum	@750.44/cum	206671.18
1.004	3.4			
	Construction of Embankment with Material Obtained from Borrow Pits Construction of embankment with approved material obtained from borrow pits with a lift upto 1.5 m, transporting to site, spreading, grading to required slope and compacting to meet requirement of Tables 300.1 and 300.2 with a lead upto 1000 m as per Technical Specification Clause 301.5			
	Net Total	1716.800cum	@463.32/cum	795427.78
1.005	4.1.A.1			
	Granular Sub-base with Well Graded Material (Table 400.1) (A) By Mix in Place Method Construction of granular sub-base by providing well graded material, spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC, and compacting with smooth wheel roller to achieve the desired density, complete as per Technical Specification Clause 401. (i) For Grading I Material			
	Net Total	1092.000cum	@2917.23/cum	3185615.16
1.006	11.4.1.1			
	Providing concrete for plain/reinforced concrete in open foundations complete as per			

EST No. :HED/CEHED/EST/105/2022_5_3_6 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	drawings and technical specifications Clause 802, 803, 1202 & 1203 I. P.C.C grade M 10 (i) Nominal mix 1:3:6			
	Net Total	717.100cum	@7646.85/cum	5483556.14
1.007	11.4.3.1			
	Providing concrete for plain/reinforced concrete in open foundations complete as per drawings and technical specifications Clause 802, 803, 1202 & 1203 III. P.C.C. grade M 20 (i) Nominal mix (1:2:4)			
	Net Total	84.200cum	@8116.64/cum	683421.09
1.008	11.4.5			
	Providing concrete for plain/reinforced concrete in open foundations complete as per drawings and technical specifications Clause 802, 803, 1202 & 1203 V. R.C.C. grade M 25			
	Net Total	650.000cum	@8861.61/cum	5760046.50
1.009	11.8			
	Supplying, fitting and placingTMT bar reinforcement in foundation complete as per drawings and technical specifications Clauses 1000 and 1202			
	Net Total	19.500tonne	@86333.07/tonne	1683494.87
1.010	4.9			
	Wet Mix Macadam Providing, laying, spreading and compacting graded stone aggregate to wet mix macadam specification including premixing the material with water at OMC in mechanical mixer (Pug Mill), carriage of mixed material by tipper to site, laying in uniform layers in sub-base/base course on a well prepared sub-base and compacting with smooth wheel roller of 80 to 100kN weight to achieve the desired density including lighting, barricading and maintenance of diversion, etc as per Tables 400.11 & 400.12 and Technical Specification Clause 406. By Mechanical Means with 1 km lead			
	Net Total	444.000cum	@3255.46/cum	1445424.24
1.011	5.1.1a			
	Prime Coat :- Low porosity Providing and applying primer coat with bitumen emulsion (SS-1) on prepared surface of granular base including cleaning of road surface and spraying primer at the rate of 0.70-1.0 kg/sqm using mechanical means as per Technical Specification Clause 502			
	Net Total	2960.000sqm	@69.68/sqm	206252.80
1.012	5.2.3a			
	Tack Coat Providing and applying tack coat with Bitumen emulsion (RS-1) using emulsion distributor at the rate of 0.25 to 0.30 kg per sqm on the prepared granular surfaces treated with primer & cleaned with Hydraulic broom as per Technical Specification Clause 503.			
	Net Total	2960.000sqm	@14.44/sqm	42742.40
			Heading Total(Rs)	19707013.56
2	**Drain**			

EST No. :HED/CEHED/EST/105/2022_5_3_6 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
2.001	13.7.1			
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	1300.000sqm	@393.71/sqm	511823.00
2.002	OD205/2022-2023			
	Laterite boulder masonry with hard departmental stone in foundation and plinth including levelling up with cement concrete 1:6:12 (one cement, six course sand , 12 graded stone aggregate 20mm nominal size),up to plinth level with cement mortar1:6 			
	Net Total	81.400cum	@4610.14/cum	375265.40
			Heading Total(Rs)	887088.40
3	**BM&BC**			
3.001	5.3.2.a			
	Providing and laying bituminous macadam with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading premixed with a bituminous binder (VG 30), transported to the site, laid over a previously prepared surface with paver finisher to the required grade, level, and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction For Grading II - (19 mm nominal size)			
	Net Total	148.000cum	@7787.76/cum	1152588.48
3.002	5.6.2.a			
	Providing and laying bituminous concrete with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with a bituminous binder(NRMB) @ 5.4 percent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level, and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 507 complete in all respects For Grading - II (13.2 mm Nominal Size)			
	Net Total	88.800cum	@12465.77/cum	1106960.38
3.003	8.13			
	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads on Bituminous Surface @ 250 gms per sqm area, the thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35. The finished surface to be level, uniform, and free from streaks and holes.			
	Net Total	148.000sqm	@494.43/sqm	73175.64
3.004	8.35			
	Providing and fixing reflective road studs (Raised Pavement Marker) of ' category A' made out of ASA/HIPS/ABS moulded body with shanks and conforming to ASTM D 4280, strong enough to support a load of more than 13.635 T when tested in accordance with ASTM D 4280, reflective panel confirming to ASTM D 788, and reflectivity conforming to clause 804.4. including installation, drilling, fixing with adhesive etc. with 2 years warranty for the road stud as well as for in field performance as per clause 804.7.3 Road Markers/Road Stud with Lense Reflector :-			

EST No. :HED/CEHED/EST/105/2022_5_3_6 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	300.000no	@195.85/no	58755.00
3.005	55.23			
	Supplying and laying interlocking tile 80mm or nearest size thickness, minimum strength M30 including providing a layer of 6mm aggregate for 5cm thickness, then laying interlock cobbles in lines and levels as per the directions of the departmental officers at site inclusive of all cost & conveyance charges etc. complete.			
	Net Total	888.000sqm	@946.36/sqm	840367.68
	Heading Total(Rs)			3231847.18
	Total Estimation PAC			23825949.14
5	**Extra Charges**			
4.001	Provision for GST			
	23825949.14		18.00%	4288670.85
	Grand Total			28114619.99
	Round off			85380.01
	Rounded Total(Rs)			28200000.00
	Rupees Two Crore Eighty Two Lakh			

PRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

EST No. :HED/CEHED/EST/105/2022_5_3_6 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District - Construction of Internal Road, Parking area and Drainage facility-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Concrete road & drainage work						
1.001	3.15.2						
	Compacting Original Ground (ii) Compacting original ground supporting subgrade Loosening of the ground upto a level of 300 mm below the subgrade level, watered, graded and compacted in layers to meet requirement of Tables 300.1 and 300.2 for subgrade construction as per Technical Specification Clause 303.5.2.						
	parking Area						
	parking Area	1.000	60.000	23.000	0.500		690.000
		1.000	70.000	42.000	0.500		1470.000
	Total						**2160.000**
	For Road						
	Main road	1.000	370.000	10.000	0.300		1110.000
	Total						**1110.000**
						Total Quantity in cum	**3270.000**
1.002	3.2						
	Preparation of Foundation for Embankment Scarifying Existing Bituminous Surface to a Depth of 150 mm by Mechanical Means Scarifying the existing bituminous road surface to a depth of 150 mm and disposal of scarified material with a lift upto 3 m and lead upto 1000 m as per Technical Specification Clause 301.4.						
	existing road						
		1.000	300.000	4.000			1200.000
	Total						**1200.000**
						Total Quantity in sqm	**1200.000**
1.003	11.1.1.1						
	Excavation for Structures Earthwork in excavation for structures as per drawing and technical specifications Clause 305.1 including setting out, construction of shoring and bracing, removal of stumps and other deleterious material and disposal upto a lead of 50 m, dressing of sides and bottom and backfilling in trenches with excavated suitable material. I. Ordinary soil (i) Upto 3 m depth						
	Drainage						
	Drain around the parking area	1.000	364.000	1.000	0.600		218.400
	Drain from parking area to river	1.000	57.000	1.000	1.000		57.000
	Total						**275.400**

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EST No. :HED/CEHED/EST/105/2022_5_3_6 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**275.400**
1.004	3.4						
	Construction of Embankment with Material Obtained from Borrow Pits Construction of embankment with approved material obtained from borrow pits with a lift upto 1.5 m, transporting to site, spreading, grading to required slope and compacting to meet requirement of Tables 300.1 and 300.2 with a lead upto 1000 m as per Technical Specification Clause 301.5						
	for road						
	Main road	1.000	370.000	11.600	0.400		1716.800
	Total						**1716.800**
						Total Quantity in cum	**1716.800**
1.005	4.1.A.1						
	Granular Sub-base with Well Graded Material (Table 400.1) (A) By Mix in Place Method Construction of granular sub-base by providing well graded material, spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC, and compacting with smooth wheel roller to achieve the desired density, complete as per Technical Specification Clause 401. (i) For Grading I Material						
	parking Area						
	parking Area	1.000	60.000	23.000	0.150		207.000
		1.000	70.000	42.000	0.150		441.000
	Total						**648.000**
	for Road						
	Main road	2.000	370.000	4.000	0.150		444.000
	Total						**444.000**
						Total Quantity in cum	**1092.000**
1.006	11.4.1.1						
	Providing concrete for plain/reinforced concrete in open foundations complete as per drawings and technical specifications Clause 802, 803, 1202 & 1203 I. P.C.C grade M 10 (i) Nominal mix 1:3:6						
	Parking Area						
	parking Area	1.000	60.000	23.000	0.100		138.000
		1.000	70.000	42.000	0.100		294.000
	Total						**432.000**
	Drainage						
	Drain around the Parking area	1.000	364.000	1.000	0.150		54.600
	drain from parking area to river	1.000	57.000	1.000	0.150		8.550
	Side wall	2.000	364.000	0.250	0.500		91.000

EST No. :HED/CEHED/EST/105/2022_5_3_6 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Side wall	2.000	57.000	0.250	0.700		19.950
	Total						**174.100**
	For Road						
	Median kerb of road	2.000	370.000	0.300	0.300		66.600
	side kerb	2.000	370.000	0.300	0.200		44.400
	Total						**111.000**
						Total Quantity in cum	**717.100**
1.007	11.4.3.1						
	Providing concrete for plain/reinforced concrete in open foundations complete as per drawings and technical specifications Clause 802, 803, 1202 & 1203 III. P.C.C. grade M 20 (i) Nominal mix (1:2:4)						
	Drainage						
	Drain around the Parking area	1.000	364.000	1.000	0.050		18.200
	drain from parking area to river	1.000	57.000	1.000	0.050		2.850
	Drain around the Parking area Cover slab	1.000	364.000	1.000	0.150		54.600
	Drain from parking area to river cover slab	1.000	57.000	1.000	0.150		8.550
	Total						**84.200**
						Total Quantity in cum	**84.200**
1.008	11.4.5						
	Providing concrete for plain/reinforced concrete in open foundations complete as per drawings and technical specifications Clause 802, 803, 1202 & 1203 V. R.C.C. grade M 25						
	Parking Area						
	parking Area	1.000	60.000	23.000	0.150		207.000
		1.000	70.000	42.000	0.150		441.000
	Guard stone 15cm height 2m c/c on the side of parking area and drain	147.000	0.200	0.200	0.150		0.882
	rounding	1.000	1.118				1.118
	Total						**650.000**
						Total Quantity in cum	**650.000**
1.009	11.8						

EST No. :HED/CEHED/EST/105/2022_5_3_6 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying, fitting and placingTMT bar reinforcement in foundation complete as per drawings and technical specifications Clauses 1000 and 1202						
	steel						
	LS Wt taken as 30kg/m3 of concrete for road work	1.000	650.000			0.030000	19.500
	Total						**19.500**
						Total Quantity in tonne	**19.500**
1.010	4.9						
	Wet Mix Macadam Providing, laying, spreading and compacting graded stone aggregate to wet mix macadam specification including premixing the material with water at OMC in mechanical mixer (Pug Mill), carriage of mixed material by tipper to site, laying in uniform layers in sub-base/base course on a well prepared sub-base and compacting with smooth wheel roller of 80 to 100kN weight to achieve the desired density including lighting, barricading and maintenance of diversion, etc as per Tables 400.11 & 400.12 and Technical Specification Clause 406. By Mechanical Means with 1 km lead						
	for road						
	Main road both side	2.000	370.000	4.000	0.150		444.000
	Total						**444.000**
						Total Quantity in cum	**444.000**
1.011	5.1.1a						
	Prime Coat :- Low porosity Providing and applying primer coat with bitumen emulsion (SS-1) on prepared surface of granular base including cleaning of road surface and spraying primer at the rate of 0.70-1.0 kg/sqm using mechanical means as per Technical Specification Clause 502						
	For Road						
	Main road both side	2.000	370.000	4.000			2960.000
	Total						**2960.000**
						Total Quantity in sqm	**2960.000**
1.012	5.2.3a						
	Tack Coat Providing and applying tack coat with Bitumen emulsion (RS-1) using emulsion distributor at the rate of 0.25 to 0.30 kg per sqm on the prepared granular surfaces treated with primer & cleaned with Hydraulic broom as per Technical Specification Clause 503.						
	For Road						
	Main road both side	2.000	370.000	4.000			2960.000
	Total						**2960.000**
						Total Quantity in sqm	**2960.000**

EST No. :HED/CEHED/EST/105/2022_5_3_6 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
2	Drain						
2.001	13.7.1						
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)						
	Drainage						
	Drain around the Parking area	1.000	364.000	2.000			728.000
	drain from parking area to river	1.000	57.000	2.200			125.400
	Total						**853.400**
	For Road						
	boundary wall of road	2.000	370.000	0.600			444.000
	rounding	1.000	2.600				2.600
	Total						**446.600**
						Total Quantity in sqm	**1300.000**
2.002	OD205/2022-2023						
	Laterite boulder masonry with hard departmental stone in foundation and plinth including levelling up with cement concrete 1:6:12 (one cement, six course sand , 12 graded stone aggregate 20mm nominal size),up to plinth level with cement mortar1:6 						
	For Road						
	Boundary wall of the road	2.000	370.000	0.350	0.200		51.800
		2.000	370.000	0.200	0.200		29.600
	Total						**81.400**
						Total Quantity in cum	**81.400**
3	BM&BC						
3.001	5.3.2.a						
	Providing and laying bituminous macadam with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading premixed with a bituminous binder (VG 30), transported to the site, laid over a previously prepared surface with paver finisher to the required grade, level, and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction For Grading II - (19 mm nominal size)						
	Road on both sides						
		2.000	370.000	4.000	0.050		148.000
	Total						**148.000**
						Total Quantity in cum	**148.000**
3.002	5.6.2.a						

EST No. :HED/CEHED/EST/105/2022_5_3_6 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and laying bituminous concrete with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with a bituminous binder(NRMB) @ 5.4 percent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level, and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 507 complete in all respects For Grading - II (13.2 mm Nominal Size)						
	road both sides						
		2.000	370.000	4.000	0.030		88.800
	Total						**88.800**
						Total Quantity in cum	**88.800**
3.003	8.13						
	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads on Bituminous Surface @ 250 gms per sqm area, the thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35. The finished surface to be level, uniform, and free from streaks and holes.						
	line marks on sides						
		2*2	370.000	0.100			148.000
	Total						**148.000**
						Total Quantity in sqm	**148.000**
3.004	8.35						
	Providing and fixing reflective road studs (Raised Pavement Marker) of ' category A' made out of ASA/HIPS/ABS moulded body with shanks and conforming to ASTM D 4280, strong enough to support a load of more than 13.635 T when tested in accordance with ASTM D 4280, reflective panel confirming to ASTM D 788, and reflectivity conforming to clause 804.4. including installation, drilling, fixing with adhesive etc. with 2 years warranty for the road stud as well as for in field performance as per clause 804.7.3 Road Markers/Road Stud with Lense Reflector :-						
	for road sides						
	LS qty taken as 300	300.000					300.000
	Total						**300.000**
						Total Quantity in no	**300.000**
3.005	55.23						
	Supplying and laying interlocking tile 80mm or nearest size thickness, minimum strength M30 including providing a layer of 6mm aggregate for 5cm thickness, then laying interlock cobbles in lines and levels as per the directions of the departmental officers at site inclusive of all cost & conveyance charges etc. complete.						
	side berm						
		2.000	370.000	1.200			888.000
	Total						**888.000**
						Total Quantity in sqm	**888.000**

EST No. :HED/CEHED/EST/105/2022_5_12_11 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of Toilet block inside the Harbour-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Toilet Block**			
1.001	2.8.1			
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil			
	Net Total	79.230cum	@291.42/cum	23089.21
1.002	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	12.912cum	@6687.21/cum	86345.26
1.003	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	43.371cum	@7069.78/cum	306623.43
1.004	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	13.495cum	@9237.20/cum	124656.01
1.005	5.34.1			
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	27.592cum	@80.55/cum	2222.54
1.006	2.25			

EST No. :HED/CEHED/EST/105/2022_5_12_11 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m.			
	Net Total	21.577cum	@253.71/cum	5474.30
1.007	4.1.6			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)			
	Net Total	5.524cum	@7076.05/cum	39088.10
1.008	50.6.7.2			
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.			
	Net Total	31.496cum	@7872.96/cum	247966.75
1.009	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	14.097cum	@10858.36/cum	153070.30
1.010	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	25.200sqm	@329.03/sqm	8291.56
1.011	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	89.860sqm	@637.63/sqm	57297.43
1.012	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	75.135sqm	@800.47/sqm	60143.31
1.013	OD5549/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo -HCR			
	Net Total	2207.360kilogram	@96.62/kilogram	213275.12

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EST No. :HED/CEHED/EST/105/2022_5_12_11 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
1.014	13.1.1			
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	273.580sqm	@308.22/sqm	84322.83
1.015	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	87.550sqm	@262.57/sqm	22988.00
1.016	13.43.1			
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer			
	Net Total	155.580sqm	@69.33/sqm	10786.36
1.017	13.83.2			
	Wall painting with premium acrylic emulsion paint of interior grade, having VOC (Volatile including applying additional coats wherever required to achieve even shade and colour.Two coats			
	Net Total	146.880sqm	@131.59/sqm	19327.94
1.018	13.47.1			
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)			
	Net Total	99.830sqm	@186.15/sqm	18583.35
1.019	11.46.1			
	Providing and laying Vitrified tiles indifferent sizes (thickness to be specified by manufacturer), with water absorption less than 0.08 % and conforming to I.S. 15622, of approved make, in all colours & shade, in skirting, riser of steps, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand), including grouting the joint with white cement & matching pigments etc. complete.Size of Tile 500x500 mm			
	Net Total	112.930sqm	@1516.68/sqm	171278.67
1.020	50.9.1.1			
	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately), using good quality Anjili wood /jack wood			
	Net Total	0.187cum	@109412.10/cum	20460.06
1.021	50.9.3.1			
	Providing and fixing paneled or paneled and glazed shutters for doors, windows and clerestory windows, 30 mm thick shutters including ISI marked M.S. pressed butt hinges bright finished of required size with necessary screws, excluding paneling which will be paid for separately, all complete as per direction 0f Engineer in- charge. using Anjili/ Jack wood			
	Net Total	5.071sqm	@3002.91/sqm	15227.76
1.022	50.9.4.1			

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EST No. :HED/CEHED/EST/105/2022_5_12_11 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Providing and fixing paneling or paneling and glazing in paneled or paneled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured) paneling for paneled or paneled and glazed shutters 25 mm to 40 mm thick using good quality Anjili/ Jack wood			
	Net Total	0.986sqm	@2725.35/sqm	2687.20
1.023	50.9.5.1			
	Providing and fixing glazed shutters for doors, windows and clerestory windows using 4 mm thick float glass panes including ISI marked M.S pressed butt hinges bright finished of required size with necessary screws. Using Anjili wood/ jack wood 35 mm thick shutters.			
	Net Total	3.280sqm	@3924.72/sqm	12873.08
1.024	9.48.2			
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc			
	Net Total	44.100kg	@211.94/kg	9346.55
1.025	9.53			
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	10.000each	@207.00/each	2070.00
1.026	9.117.2			
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 42x50 mm			
	Net Total	20.000metre	@308.89/metre	6177.80
1.027	9.118.1			
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and			

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Sl No	Specification	Quantity	Rate	Amount
	fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).			
	Net Total	6.720sqm	@2033.68/sqm	13666.33
1.028	50.9.15.1			
	Supplying and fixing 200 mm Aluminium aldrop			
	Net Total	5.000no	@171.51/no	857.55
1.029	9.63.3			
	Providing and fixing ISI marked oxidised M.S. tower bolt black finish, (Barrel type) with necessary screws etc. complete:150x10 mm			
	Net Total	5.000no	@60.70/no	303.50
1.030	14.35.3			
	Providing and fixing finished brass hard drawn hooks and eyes:200 mm			
	Net Total	14.000no	@85.95/no	1203.30
1.031	14.35.5			
	Providing and fixing finished brass hard drawn hooks and eyes:100 mm			
	Net Total	11.000no	@60.44/no	664.84
1.032	9.66.1			
	Providing and fixing ISI marked oxidised M.S. handles conforming to IS : 4992 with necessary screws etc. complete:125 mm			
	Net Total	1.000no	@40.27/no	40.27
1.033	13.85.1			
	Applying priming coats with primer of approved brand and manufacture, having low VOC (Volatile Organic Compound) content.With ready mixed pink or grey primer on wood work (hard and soft wood) having VOC content less than 50 grams/ litre			
	Net Total	12.516sqm	@65.91/sqm	824.93
1.034	13.61.1			
	Painting with synthetic enamel paint of approved brand and manufacture to give an even shade:Two or more coats on new work			
	Net Total	11.318sqm	@140.37/sqm	1588.71
1.035	13.52.1			
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work			
	Net Total	13.945sqm	@219.17/sqm	3056.33
1.036	17.3.2			
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.c. pan with ISI marked black solid plastic seat			

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Sl No	Specification	Quantity	Rate	Amount
	and lid			
	Net Total	4.000each	@7582.40/each	30329.60
1.037	50.17.1.4			
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.			
	Net Total	4.000no	@758.07/no	3032.28
1.038	17.4.1			
	Providing and fixing white vitreous china flat back or wall corner type lipped front urinal basin of 430x260x350 mm and 340x410x265 mm sizes respectively with automatic flushing cistern with standard flush pipe and C.P. brass spreaders with brass unions and G.I. clamps complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required:One urinal basin with 5 litre white P.V.C. automatic flushing cistern			
	Net Total	4.000each	@5754.71/each	23018.84
1.039	17.7.2			
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 630 x 450 mm with a single 15 mm C.P. brass pillar tap			
	Net Total	6.000each	@3177.85/each	19067.10
1.040	18.48			
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.			
	Net Total	3000.000Litre	@10.18/Litre	30540.00
1.041	50.18.9.9.2			
	Providing and fixing PVC pipes includes joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in CHarge. 110 mm dia 4 Kg/cm2			
	Net Total	50.000metre	@471.14/metre	23557.00
1.042	50.18.9.7.2			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge.63 mm dia 4 Kgf/cm2			
	Net Total	50.000metre	@300.47/metre	15023.50
1.043	50.18.7.4.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 10Kgf/cm2- Internal work - Exposed on wall			
	Net Total	150.000metre	@313.08/metre	46962.00

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Sl No	Specification	Quantity	Rate	Amount
1.044	50.18.8.3.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 25 mm pipe 10kgf /cm2			
	Net Total	150.000metre	@414.35/metre	62152.50
1.045	50.18.9.20.3			
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 63 mm dia Door Elbow			
	Net Total	6.000no	@79.76/no	478.56
1.046	50.18.9.22.3			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement-110 mm dia Door Elbow			
	Net Total	4.000no	@131.22/no	524.88
1.047	50.18.9.22.4			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement- 110 mm dia Bend			
	Net Total	4.000no	@160.26/no	641.04
1.048	50.18.9.22.6			
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 110x110x110 mm dia Door tee			
	Net Total	4.000no	@186.75/no	747.00
1.049	50.17.1.1			
	Supplying and fixing Stainless steel soap dish including cost of materials and labour charges etc complete as per the direction of site Engineer-in-charge.			
	Net Total	10.000no	@66.98/no	669.80
1.050	50.17.1.3			
	Supplying and fixing CP Towel rod 60cm or nearest available length including cost of materials and labour charges etc complete as per the direction of site Engineer-in-charge.			
	Net Total	6.000no	@128.14/no	768.84
1.051	50.18.9.21.7			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Vent cowl			
	Net Total	4.000no	@86.15/no	344.60
1.052	18.58.1.1			
	Providing and fixing PTMT grating of approved quality and colour. Circular type100 mm nominal dia			
	Net Total	10.000each	@43.76/each	437.60
1.053	19.4.1.1			
	Providing and fixing square-mouth S.W. gully trap class SP -1 complete with C.I. grating brick masonry chamber with water tight C.I. cover with frame of 300x300 mm size (inside) the weight of cover to be not less than 4.50 kg and frame to be not less than 3.20 kg as per standard design: 100x100 mm size P typeWith common burnt clay F.P.S. (non modular) bricks of class designation 7.5			

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Sl No	Specification	Quantity	Rate	Amount
	Net Total	4.000each	@2664.66/each	10658.64
1.054	18.18.2			
	Providing and fixing ball valve (brass) of approved quality, High or low pressure, with plastic floats complete:20 mm nominal bore			
	Net Total	5.000each	@446.34/each	2231.70
1.055	18.51.1			
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore			
	Net Total	20.000each	@637.96/each	12759.20
1.056	17.31			
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.			
	Net Total	2.000each	@1481.95/each	2963.90
1.057	10.3			
	Providing and fixing in position collapsible steel shutters with vertical channels 20x10x2 mm and braced with flat iron diagonals 20x5 mm size, with top and bottom rail of T-iron 40x40x6 mm, with 40 mm dia steel pulleys, complete with bolts, nuts,locking arrangement, stoppers, handles, including applying a priming coat of approved steel primer .			
	Net Total	4.500sqm	@10014.78/sqm	45066.51
1.058	19.7.1.2			
	Constructing brick masonry manhole in cement mortar 1:4 (1 cement : 4 coarse sand) with R.C.C. top with 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size), foundation concrete 1:4:8 mix (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size,) inside plastering 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with floating coat of neat cement and making channels in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement complete as per standard design: Inside size 90x80 cm and 45 cm deep including C.I. cover with frame (light duty) 455x610 mm internal dimensions, total weight of cover and frame to be not less than 38 kg (weigh of cover 23 kg and weight of frame 15 kg):With Sewer bricks conforming to IS : 4885			
	Net Total	1.000each	@12608.11/each	12608.11
1.059	19.33			
	Constructing soak pit 1.20x1.20 m filled with brickbats including S.W. drain pipe 100 mm diameter and 1.20 m long complete as per standard design.			
	Net Total	3.000each	@3012.28/each	9036.84
1.060	19.15.1			
	Providing M.S. foot rests including fixing in manholes with 20x20x10 cm cement concrete blocks 1:3:6 (1 cement : 3 coarse sand: 6 graded stone aggregate 20 mm nominal size) as per standard design.With 20x20 mm square bar			

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Sl No	Specification	Quantity	Rate	Amount
	Net Total	1.000each	@487.68/each	487.68
1.061	10.2			
	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.			
	Net Total	117.400kg	@117.55/kg	13800.37
			Heading Total(Rs)	2113786.77
			Total Estimation PAC	2113786.77
3	**Extra Charges**			
2.001	Provision for GST			
	2113786.77		18.00%	380481.62
			Grand Total	2494268.39
			Round off	5731.61
			Rounded Total(Rs)	2500000.00
	Rupees Twenty Five Lakh			

PRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

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DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of Toilet block inside the Harbour-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Toilet Block						
1.001	2.8.1						
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil						
	Earthwork						
	Long wall	2.000	13.900	0.800	0.750		16.680
	Short wall	3.000	4.800	0.800	0.750		8.640
	Tank- LW	2.000	3.400	0.800	0.750		4.080
	Tank -SW	2.000	1.500	0.800	0.750		1.800
	W/C - LW	4.000	2.000	0.800	0.750		4.800
	W/C - SW	3.000	1.700	0.800	0.750		3.060
	Wash area- LW	1.000	1.900	0.800	0.750		1.140
	Wash area- SW	1.000	1.700	0.800	0.750		1.020
	Wash area- LW	1.000	1.900	0.800	0.750		1.140
	Cloak room- LW	1.000	3.300	0.800	0.750		1.980
	Cloak room- SW	1.000	1.800	0.800	0.750		1.080
	Courtyard	1.000	1.400	0.800	0.750		0.840
	Step	1.000	1.500	0.600	0.150		0.135
	Step	1.000	2.000	0.600	0.150		0.180
	Septic tank	1.000	5.500	2.100	1.500		17.325
	Soak pit	3.000	1.400	1.400	1.000		5.880
	Column	6.000	1.500	1.500	0.700		9.450
	Total						**79.230**
						Total Quantity in cum	**79.230**
1.002	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	PCC						
	Long wall	2.000	13.900	0.800	0.150		3.336
	Short wall	3.000	4.800	0.800	0.150		1.728

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Tank- LW	2.000	3.400	0.800	0.150		0.816
	Tank -SW	2.000	1.500	0.800	0.150		0.360
	W/C - LW	4.000	2.000	0.800	0.150		0.960
	W/C - SW	3.000	1.700	0.800	0.150		0.612
	Wash area- LW	1.000	1.900	0.800	0.150		0.228
	Wash area- SW	1.000	1.700	0.800	0.150		0.204
	Wash area- LW	1.000	1.900	0.800	0.150		0.228
	Cloak room- LW	1.000	3.300	0.800	0.150		0.396
	Cloak room- SW	1.000	1.800	0.800	0.150		0.216
	Courtyard	1.000	1.400	0.800	0.150		0.168
	Column	6.000	1.500	1.500	0.100		1.350
	Septic tank	1.000	5.500	2.100	0.200		2.310
	Total						**12.912**
						Total Quantity in cum	**12.912**
1.003	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	RR masonry						
	Foundation-Long wall	2.000	13.900	0.600	0.600		10.008
	Foundation-Short wall	3.000	4.800	0.600	0.600		5.184
	Foundation-Tank- LW	2.000	3.400	0.600	0.600		2.448
	Foundation-Tank -SW	2.000	1.500	0.600	0.600		1.080
	Foundation-W/C - LW	4.000	2.000	0.600	0.600		2.880
	Foundation-W/C - SW	3.000	1.700	0.600	0.600		1.836
	Foundation-Wash area- LW	1.000	1.900	0.600	0.600		0.684
	Foundation-Wash area- SW	1.000	1.700	0.600	0.600		0.612
	Foundation-Wash area- LW	1.000	1.900	0.600	0.600		0.684
	Foundation-Cloak room- LW	1.000	3.300	0.600	0.600		1.188
	Foundation-Cloak room- SW	1.000	1.800	0.600	0.600		0.648

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Foundation-Courtyard	1.000	1.400	0.600	0.600		0.504
	Basement-Long wall	2.000	13.900	0.450	0.450		5.630
	Basement-Short wall	3.000	4.800	0.450	0.450		2.916
	Basement-Tank-LW	2.000	3.400	0.450	0.450		1.377
	Basement-Tank - SW	2.000	1.500	0.450	0.450		0.608
	Basement-W/C - LW	4.000	2.000	0.450	0.450		1.620
	Basement-W/C - SW	3.000	1.700	0.450	0.450		1.033
	Basement-Wash area- LW	1.000	1.900	0.450	0.450		0.385
	Basement-Wash area- SW	1.000	1.700	0.450	0.450		0.344
	Basement-Wash area- LW	1.000	1.900	0.450	0.450		0.385
	Basement-Cloak room- LW	1.000	3.300	0.450	0.450		0.668
	Basement-Cloak room- SW	1.000	1.800	0.450	0.450		0.365
	Basement-Courtyard	1.000	1.400	0.450	0.450		0.284
	Total						**43.371**
						Total Quantity in cum	**43.371**
1.004	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	Rcc up to plinth level						
	Basement-Long wall	2.000	13.900	0.450	0.100		1.251
	Basement-Short wall	3.000	4.800	0.450	0.100		0.648
	Basement-Tank-LW	2.000	3.400	0.450	0.100		0.306

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Basement-Tank - SW	2.000	1.500	0.450	0.100		0.135
	Basement-W/C - LW	4.000	2.000	0.450	0.100		0.360
	Basement-W/C - SW	3.000	1.700	0.450	0.100		0.230
	Basement-Wash area- LW	1.000	1.900	0.450	0.100		0.086
	Basement-Wash area- SW	1.000	1.700	0.450	0.100		0.077
	Basement-Wash area- LW	1.000	1.900	0.450	0.100		0.086
	Basement-Cloak room- LW	1.000	3.300	0.450	0.100		0.149
	Basement-Cloak room- SW	1.000	1.800	0.450	0.100		0.081
	Basement-Courtyard	1.000	1.400	0.450	0.100		0.063
	Column footing	6.000	1.400	1.400	0.300		3.528
		6.000	0.800	0.800	0.300		1.152
	Septic tank bed	1.000	5.300	1.900	0.150		1.511
	Side wall	1.000	14.400	0.150	1.700		3.672
	Baffle wall	2.000	1.600	0.050	1.000		0.160
	Total						**13.495**
						Total Quantity in cum	**13.495**
1.005	5.34.1						
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	Rcc up to plinth level						
	Basement-Long wall	2.000	13.900	0.450	0.100		1.251
	Basement-Short wall	3.000	4.800	0.450	0.100		0.648
	Basement-Tank-LW	2.000	3.400	0.450	0.100		0.306
	Basement-Tank - SW	2.000	1.500	0.450	0.100		0.135
	Basement-W/C - LW	4.000	2.000	0.450	0.100		0.360
	Basement-W/C - SW	3.000	1.700	0.450	0.100		0.230

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Basement-Wash area- LW	1.000	1.900	0.450	0.100		0.086
	Basement-Wash area- SW	1.000	1.700	0.450	0.100		0.077
	Basement-Wash area- LW	1.000	1.900	0.450	0.100		0.086
	Basement-Cloak room- LW	1.000	3.300	0.450	0.100		0.149
	Basement-Cloak room- SW	1.000	1.800	0.450	0.100		0.081
	Basement-Courtyard	1.000	1.400	0.450	0.100		0.063
	Column footing	6.000	1.400	1.400	0.300		3.528
		6.000	0.800	0.800	0.300		1.152
	Septic tank bed	1.000	5.300	1.900	0.150		1.511
	Side wall	1.000	14.400	0.150	1.700		3.672
	Baffle wall	2.000	1.600	0.050	1.000		0.160
	Total						**13.495**
	Lintel						
		2.000	8.400	0.200	0.150		0.504
		1.000	3.000	0.200	0.150		0.090
		3.000	5.000	0.200	0.150		0.450
		1.000	6.600	0.200	0.150		0.198
	Total						**1.242**
	Beam						
		2.000	8.400	0.300	0.300		1.512
		3.000	3.000	0.300	0.300		0.810
	Total						**2.322**
	Sunshade						
		1.000	8.400	0.600	0.100		0.504
		1.000	3.000	0.600	0.100		0.180
		1.000	5.000	0.600	0.100		0.300
		1.000	6.600	0.600	0.100		0.396
	Total						**1.380**
	Roof						
	Roof	1.000	8.900	5.600	0.150		7.476
	Deduction-courtyard	-1.000	2.000	1.700	0.150		-0.510
	Deduction- wash area	-1.000	1.800	1.100	0.150		-0.297

EST No. :HED/CEHED/EST/105/2022_5_12_11 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**6.669**
	column						
		6.000	0.400	0.300	3.450		2.484
	Total						**2.484**
						Total Quantity in cum	**27.592**
1.006	2.25						
	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m.						
	Earth filling						
	Bath area & wash area	1.000	10.300	1.100	0.250		2.833
	Bath area	1.000	1.000	3.000	0.250		0.750
	Tank and passage around	1.000	2.900	3.700	0.450		4.829
	Passage	1.000	2.600	0.600	0.450		0.702
	w/c	4.000	1.800	1.200	0.450		3.888
	Cloak room	1.000	1.800	2.300	0.450		1.863
	Courtyard	1.000	2.000	1.700	0.450		1.530
	Wash area	1.000	1.200	0.800	0.250		0.240
	Wash area	1.000	1.400	0.800	0.250		0.280
	Passage + hand wash area	1.000	3.300	2.400	0.450		3.564
	Passage + urinal	1.000	2.000	0.800	0.450		0.720
	Passage infront of wash area	1.000	0.600	1.400	0.450		0.378
	Total						**21.577**
						Total Quantity in cum	**21.577**
1.007	4.1.6						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)						
	CC Flooring						
	Bath area & wash area	1.000	10.300	1.100	0.100		1.133
	Bath area	1.000	1.000	3.000	0.100		0.300
	Tank and passage around	1.000	2.900	3.700	0.100		1.073
	Passage	1.000	2.600	0.600	0.100		0.156
	w/c	4.000	1.800	1.200	0.100		0.864

EST No. :HED/CEHED/EST/105/2022_5_12_11 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Cloak room	1.000	1.800	2.300	0.100		0.414
	Courtyard	1.000	2.000	1.700	0.100		0.340
	Wash area	1.000	1.200	0.800	0.100		0.096
	Wash area	1.000	1.400	0.800	0.100		0.112
	Passage + hand wash area	1.000	3.300	2.400	0.100		0.792
	Passage + urinal	1.000	2.000	0.800	0.100		0.160
	Passage infront of wash area	1.000	0.600	1.400	0.100		0.084
	Total						**5.524**
						Total Quantity in cum	**5.524**
1.008	50.6.7.2						
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.						
	Laterite masonry						
	Bath area	1.000	16.500	0.100	1.000		1.650
	Cloak room-front wall	1.000	2.900	0.100	1.000		0.290
	Cloak room	1.000	7.000	0.200	3.000		4.200
	outer wall- LW	1.000	8.300	0.200	3.000		4.980
	outer wall-SW	1.000	5.000	0.200	3.000		3.000
	W/C - LW	2.000	8.300	0.200	3.000		9.960
	W/C - SW	4.000	1.200	0.200	3.000		2.880
	Wash area	2.000	2.400	0.200	3.000		2.880
	urinal	1.000	0.600	0.200	3.000		0.360
	wall near step	2.000	0.200	0.200	3.000		0.240
	Basement-Outer wall	1.000	40.000	0.450	0.450		8.100
	Basement-Wash area	2.000	4.000	0.450	0.450		1.620
	Basement-Cloak room- LW	2.000	3.300	0.450	0.450		1.337
	Basement-Cloak room- SW	2.000	1.800	0.450	0.450		0.729
	Basement-Courtyard	1.000	5.000	0.450	0.450		1.013
	Basement-urinal	1.000	0.600	0.450	0.450		0.122
	Step	1.000	1.500	0.600	0.300		0.270
		1.000	1.500	0.300	0.300		0.135
	Step	1.000	2.000	0.600	0.300		0.360

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		1.000	2.000	0.300	0.300		0.180
	Deduction - Door	-4.000	1.000		2.100		-8.400
	Deduction - window	-1.000	1.500		1.500		-2.250
	Deduction - ventilator	-4.000	0.900		0.600		-2.160
	Total						**31.496**
						Total Quantity in cum	**31.496**
1.009	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	Lintel						
		2.000	8.400	0.200	0.150		0.504
		1.000	3.000	0.200	0.150		0.090
		3.000	5.000	0.200	0.150		0.450
		1.000	6.600	0.200	0.150		0.198
	Total						**1.242**
	Beam						
		2.000	8.400	0.300	0.300		1.512
		3.000	3.000	0.300	0.300		0.810
	Total						**2.322**
	Sunshade						
		1.000	8.400	0.600	0.100		0.504
		1.000	3.000	0.600	0.100		0.180
		1.000	5.000	0.600	0.100		0.300
		1.000	6.600	0.600	0.100		0.396
	Total						**1.380**
	Roof						
	Roof	1.000	8.900	5.600	0.150		7.476
	Deduction- courtyard	-1.000	2.000	1.700	0.150		-0.510
	Deduction- wash area	-1.000	1.800	1.100	0.150		-0.297
	Total						**6.669**

EST No. :HED/CEHED/EST/105/2022_5_12_11 (Edit Id : 12)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	column						
		6.000	0.400	0.300	3.450		2.484
	Total						**2.484**
						Total Quantity in cum	**14.097**
1.010	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	centering and suttering						
	Column	6.000	1.400		3.000		25.200
	Total						**25.200**
						Total Quantity in sqm	**25.200**
1.011	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	shuttering						
	Lintel	2.000	34.800		0.150		10.440
		2.000	7.800		0.150		2.340
	Beam Bottom	2.000	16.800	0.300			10.080
	Side	2.000	16.800		0.150		5.040
	Beam Bottom	2.000	9.600	0.300			5.760
	Side	2.000	9.600		0.150		2.880
	Septic tank outside all round	1.000	14.400		1.700		24.480
	Septic tank inside all round	1.000	13.200		1.700		22.440
	Baffle wall	4.000	1.600		1.000		6.400
	Total						**89.860**
						Total Quantity in sqm	**89.860**
1.012	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	centering and shuttering						
	Roof slab Bottom	1.000	8.000	3.000			24.000
	Roof slab Bottom	1.000	5.000	2.300			11.500
	Roof slab Side	1.000	28.500		0.150		4.275
	Septic tank cover	1.000	5.000	1.600			8.000
	Septic tank all side	1.000	14.400		1.700		24.480

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Septic tank all side	1.000	14.400	0.200			2.880
	Total						**75.135**
						Total Quantity in sqm	**75.135**
1.013	OD5549/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo -HCR						
	steel						
	LS quantity of 80kg/m3	27.592				80.000000	2207.360
	Total						**2207.360**
						Total Quantity in kilogram	**2207.360**
1.014	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	Wall plastering						
	Bath area internal wall	2.000	4.800		1.000		9.600
	Bath area external wall	2.000	5.000		1.000+.1		11.000
	Bath area internal wall	1.000	6.800		1.000		6.800
	Bath area external wall	1.000	6.900		1.000+.1		7.590
	Tank internal long wall	2.000	2.700		1.000		5.400
	Tank external long wall	2.000	2.900		1.000+.2		6.960
	Tank internal short wall	1.000	1.500		1.000		1.500
	Tank external short wall	1.000	1.900		1.000+.2		2.280
	External long wall	1.000	8.400		3.000		25.200
	External short wall	2.000	3.400		3.000		20.400
	W/C internal long wall	12.000	1.800		3.000		64.800
	W/C internal short wall	8.000	1.200		3.000		28.800
	Wash area wall	3.000	1.400		3.000		12.600
	Cloak room long wall	3.000	2.500		3.000		22.500

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Cloak room short wall	1.000	1.800		3.000		5.400
	Cloak room half wall	2.000	2.700		1.000+.2		6.480
	Urinal long wall	1.000	2.000		3.000		6.000
	Urinal short wall	1.000	0.800		3.000		2.400
	Courtyard wall	1.000	3.400		3.000		10.200
	Wash area long wall	1.000	1.400		3.000		4.200
	Wash area short wall	2.000	1.000		3.000		6.000
	Basement	2.000	14.000		0.450		12.600
		2.000	5.000		0.450		4.500
	Step	2.000	1.500		0.600		1.800
		2.000	0.900		0.300		0.540
	Step	2.000	2.000		0.600		2.400
		2.000	0.900		0.300		0.540
	Deduction - Door	-4.000	1.000		2.100		-8.400
	Deduction - window	-1.000	1.500		1.500		-2.250
	Deduction - ventilator	-4.000	0.900		0.600		-2.160
	Deduction - step	-1.000	1.500		0.600		-0.900
	Deduction - step	-1.000	2.000		0.600		-1.200
	Total						**273.580**
						Total Quantity in sqm	**273.580**
1.015	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	Ceiling						
	W/C	4.000	1.800	1.200			8.640
	Wash area	1.000	1.400	1.500			2.100
	Cloak room	1.000	2.300	1.800			4.140
	Urinal	1.000	2.500	0.800			2.000
	Hand wash area	1.000	3.300	2.400			7.920
	Courtyard wall	1.000	2.000	1.700			3.400
	Hand wash area	1.000	1.800	1.500			2.700
	Beam	4.000	3.600	0.900			12.960
		3.000	2.700	0.900			7.290
	Sunshade long wall	1.000	9.600	1.300			12.480

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Sunshade short wall	1.000	5.600	1.300			7.280
		1.000	3.800	1.300			4.940
		1.000	2.400	1.300			3.120
		1.000	6.600	1.300			8.580
	Total						**87.550**
						Total Quantity in sqm	**87.550**
1.016	13.43.1						
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	Primer						
	W/C internal long wall	12.000	1.800		3.000		64.800
	W/C internal short wall	8.000	1.200		3.000		28.800
	Wash area wall	3.000	1.400		3.000		12.600
	Cloak room long wall	3.000	2.500		3.000		22.500
	Cloak room short wall	1.000	1.800		3.000		5.400
	Cloak room half wall	1.000	2.700		1.000+.2		3.240
	Urinal long wall	1.000	2.000		3.000		6.000
	Urinal short wall	1.000	0.800		3.000		2.400
	Courtyard wall	1.000	3.400		3.000		10.200
	Wash area long wall	1.000	1.400		3.000		4.200
	Wash area short wall	2.000	1.000		3.000		6.000
	Deduction - Door	-4.000	1.000		2.100		-8.400
	Deduction - window	-1.000	1.500		1.500		-2.250
	Deduction - ventilator	-4.000	0.900		0.600		-2.160
	Deduction - step	-1.000	1.500		0.600		-0.900
	Deduction - step	-1.000	2.000		0.600		-1.200
	W/C	4.000	1.800	1.200			8.640
	Wash area	1.000	1.400	1.500			2.100
	Cloak room	1.000	2.300	1.800			4.140
	Urinal	1.000	2.500	0.800			2.000
	Hand wash area	1.000	3.300	2.400			7.920

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Courtyard wall	1.000	2.000	1.700			3.400
	Hand wash area	1.000	1.800	1.500			2.700
	Beam	4.000	3.600	0.900			12.960
		3.000	2.700	0.900			7.290
	Deduction w/c wall	-12.000	1.800		1.500		-32.400
	Deduction w/c wall	-8.000	1.200		1.500		-14.400
	Total						**155.580**
						Total Quantity in sqm	**155.580**
1.017	13.83.2						
	Wall painting with premium acrylic emulsion paint of interior grade, having VOC (Volatile including applying additional coats wherever required to achieve even shade and colour.Two coats						
	Interior painting						
	W/C internal long wall	8.000	1.800		3.000		43.200
	W/C internal short wall	8.000	1.200		3.000		28.800
	Wash area wall	3.000	1.400		3.000		12.600
	Cloak room long wall	3.000	2.500		3.000		22.500
	Cloak room short wall	1.000	1.800		3.000		5.400
	Cloak room half wall	1.000	2.700		1.000+.2		3.240
	Urinal long wall	1.000	2.000		3.000		6.000
	Urinal short wall	1.000	0.800		3.000		2.400
	Courtyard wall	1.000	3.400		3.000		10.200
	Wash area long wall	1.000	1.400		3.000		4.200
	Wash area short wall	2.000	1.000		3.000		6.000
	Deduction - Door	-4.000	1.000		2.100		-8.400
	Deduction - window	-1.000	1.500		1.500		-2.250
	Deduction - ventilator	-4.000	0.900		0.600		-2.160
	W/C	4.000	1.800	1.200			8.640
	Wash area	1.000	1.400	1.500			2.100
	Cloak room	1.000	2.300	1.800			4.140
	Urinal	1.000	2.500	0.800			2.000

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Hand wash area	1.000	3.300	2.400			7.920
	Courtyard wall	1.000	2.000	1.700			3.400
	Hand wash area	1.000	1.800	1.500			2.700
	Beam	4.000	3.600	0.900			12.960
		3.000	2.700	0.900			7.290
	Deduction w/c wall	-8.000	1.800		1.500		-21.600
	Deduction w/c wall	-8.000	1.200		1.500		-14.400
	Total						**146.880**
						Total Quantity in sqm	**146.880**
1.018	13.47.1						
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)						
	Exterior painting						
	Bath area external wall	2.000	5.000		1.000+.1		11.000
	Bath area internal wall	1.000	6.800		1.000		6.800
	Bath area external wall	1.000	6.900		1.000+.1		7.590
	Tank internal short wall	1.000	1.500		1.000		1.500
	External long wall	1.000	8.400		3.000		25.200
	External short wall	2.000	3.400		3.000		20.400
	Wash area wall	3.000	1.400		3.000		12.600
	Basement	2.000	14.000		0.500		14.000
		2.000	5.000		0.500		5.000
	Deduction - ventilator	-4.000	0.900		0.600		-2.160
	Deduction - step	-1.000	1.500		0.600		-0.900
	Deduction - step	-1.000	2.000		0.600		-1.200
	Total						**99.830**
						Total Quantity in sqm	**99.830**
1.019	11.46.1						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and laying Vitrified tiles indifferent sizes (thickness to be specified by manufacturer), with water absorption less than 0.08 % and conforming to I.S. 15622, of approved make, in all colours & shade, in skirting, riser of steps, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand), including grouting the joint with white cement & matching pigments etc. complete.Size of Tile 500x500 mm						
	Wall & floor tiles						
	w/c	4.000	1.800	1.200			8.640
	Cloak room	1.000	20.000	2.500			50.000
	Courtyard	1.000	2.200	1.700			3.740
	Wash area	1.000	1.400	0.900			1.260
	Wash area	1.000	1.600	0.900			1.440
	Passage + hand wash area	1.000	3.500	2.600			9.100
	Passage + urinal	1.000	2.100	0.900			1.890
	Passage infront of wash area	1.000	0.700	1.400			0.980
	Step	2.000	1.500		0.600		1.800
		2.000	0.900		0.300		0.540
	Step	2.000	2.000		0.600		2.400
		2.000	0.900		0.300		0.540
	For wall w/c	4.000	5.100		1.500		30.600
	Total						**112.930**
						Total Quantity in sqm	**112.930**
1.020	50.9.1.1						
	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately), using good quality Anjili wood /jack wood						
	Frame						
	Door - V	1*2	0.100	0.070	2.100		0.029
	Door - H	1*1	1.200	0.070	0.100		0.008
	Window - Verticals	1*4	0.100	0.070	1.500		0.042
	Window- Horizontal	1*2	1.700	0.070	0.100		0.024
	Ventilator	4*2	0.900	0.100	0.070		0.050
	Ventilator	4*2	0.600	0.100	0.070		0.034
	Total						**0.187**
						Total Quantity in cum	**0.187**
1.021	50.9.3.1						

EST No. :HED/CEHED/EST/105/2022_5_12_11 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing paneled or paneled and glazed shutters for doors, windows and clerestory windows, 30 mm thick shutters including ISI marked M.S. pressed butt hinges bright finished of required size with necessary screws, excluding paneling which will be paid for separately, all complete as per direction 0f Engineer in- charge. using Anjili/ Jack wood						
	Shutter						
	Door	1.000	2.000		1.000		2.000
	Window	1*3	0.410		1.360		1.673
	Ventilator	4.000	0.460		0.760		1.398
	Total						**5.071**
						Total Quantity in sqm	**5.071**
1.022	50.9.4.1						
	Providing and fixing paneling or paneling and glazing in paneled or paneled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured) paneling for paneled or paneled and glazed shutters 25 mm to 40 mm thick using good quality Anjili/ Jack wood						
	Panel						
	Door	4.000	0.850	0.290			0.986
	Total						**0.986**
						Total Quantity in sqm	**0.986**
1.023	50.9.5.1						
	Providing and fixing glazed shutters for doors, windows and clerestory windows using 4 mm thick float glass panes including ISI marked M.S pressed butt hinges bright finished of required size with necessary screws. Using Anjili wood/ jack wood 35 mm thick shutters.						
	window glass						
	window	1*3	1.400	0.400			1.680
	ventilator	1*4	0.800	0.500			1.600
	Total						**3.280**
						Total Quantity in sqm	**3.280**
1.024	9.48.2						
	Providing and fixing M.S. Grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.Fixed to openings/ wooden frames with rawl plugs screws etc						
	window grill						
	window- LS qty 10kg/m2	1*3	1.500	0.500		10.000000	22.500
	ventilator- LS qty 10kg/m2	1*4	0.900	0.600		10.000000	21.600
	Total						**44.100**

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EST No. :HED/CEHED/EST/105/2022_5_12_11 (Edit Id : 12)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in kg	**44.100**
1.025	9.53						
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	Iron holdfast						
	Door - D	6.000					6.000
	Window	4.000					4.000
	Total						**10.000**
						Total Quantity in each	**10.000**
1.026	9.117.2						
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 42x50 mm						
	uPVC Door frame						
	Toilet	4*1	5.000				20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
1.027	9.118.1						
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).						
	uPVC Door shutter						
	Door	4*1	0.800		2.100		6.720
	Total						**6.720**
						Total Quantity in sqm	**6.720**
1.028	50.9.15.1						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying and fixing 200 mm Aluminium aldrop						
	Aldrop						
	Door	5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
1.029	9.63.3						
	Providing and fixing ISI marked oxidised M.S. tower bolt black finish, (Barrel type) with necessary screws etc. complete:150x10 mm						
	Tower bolt						
	Door	5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
1.030	14.35.3						
	Providing and fixing finished brass hard drawn hooks and eyes:200 mm						
	Hooks and Eyes 200mm						
	window stay	6.000					6.000
	ventilator	8.000					8.000
	Total						**14.000**
						Total Quantity in no	**14.000**
1.031	14.35.5						
	Providing and fixing finished brass hard drawn hooks and eyes:100 mm						
	Hooks and Eyes 100mm						
	window shutter	3.000					3.000
	ventilator	8.000					8.000
	Total						**11.000**
						Total Quantity in no	**11.000**
1.032	9.66.1						
	Providing and fixing ISI marked oxidised M.S. handles conforming to IS : 4992 with necessary screws etc. complete:125 mm						
	MS handle						
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.033	13.85.1						
	Applying priming coats with primer of approved brand and manufacture, having low VOC (Volatile Organic Compound) content.With ready mixed pink or grey primer on wood work (hard and soft wood) having VOC content less than 50 grams/ litre						
	priming coat on wood work						

EST No. :HED/CEHED/EST/105/2022_5_12_11 (Edit Id : 12)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Door	1.000	1.000		2.100	2.600000	5.460
	Window	1.000	1.500		1.500	1.600000	3.600
	Ventilator	4.000	0.900		0.600	1.600000	3.456
	Total						**12.516**
						Total Quantity in sqm	**12.516**
1.034	13.61.1						
	Painting with synthetic enamel paint of approved brand and manufacture to give an even shade:Two or more coats on new work						
	Enamel paint						
	Door	1.000	1.000		2.100	1.125000	2.363
	Window	1.000	1.500		1.500	0.500000	1.125
	Ventilator	4.000	0.900		0.600	0.500000	1.080
	Collapsible steel shutter	1.000	1.500		3.000	1.500000	6.750
	Total						**11.318**
						Total Quantity in sqm	**11.318**
1.035	13.52.1						
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work						
	Epoxy paint						
	Window	1.000	1.500		1.500	0.500000	1.125
	Ventilator	4.000	0.900		0.600	0.500000	1.080
	Courtyard	1.000	1.900		1.500	1.000000	2.850
		1.000	1.700		1.500	1.000000	2.550
	Door	1.000	1.500		2.100	1.000000	3.150
	Counter Room	1.000	2.900		1.100	1.000000	3.190
	Total						**13.945**
						Total Quantity in sqm	**13.945**
1.036	17.3.2						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.c. pan with ISI marked black solid plastic seat and lid						
	European type						
		4.000					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**
1.037	50.17.1.4						
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.						
	CP Health faucet						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.038	17.4.1						
	Providing and fixing white vitreous china flat back or wall corner type lipped front urinal basin of 430x260x350 mm and 340x410x265 mm sizes respectively with automatic flushing cistern with standard flush pipe and C.P. brass spreaders with brass unions and G.I. clamps complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required:One urinal basin with 5 litre white P.V.C. automatic flushing cistern						
	Urinal basin						
		4.000					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**
1.039	17.7.2						
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 630 x 450 mm with a single 15 mm C.P. brass pillar tap						
	Wash basin						
		6.000					6.000
	Total						**6.000**
						Total Quantity in each	**6.000**
1.040	18.48						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.						
	Tank						
		3000.000					3000.000
	Total						**3000.000**
						Total Quantity in Litre	**3000.000**
1.041	50.18.9.9.2						
	Providing and fixing PVC pipes includes joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in CHarge. 110 mm dia 4 Kg/cm2						
	pvc pipes						
		50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.042	50.18.9.7.2						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge.63 mm dia 4 Kgf/cm2						
	PVC Pipe 63mm						
		50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.043	50.18.7.4.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 10Kgf/cm2- Internal work - Exposed on wall						
	PVC PIPE 32MM						
		150.000					150.000
	Total						**150.000**
						Total Quantity in metre	**150.000**
1.044	50.18.8.3.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 25 mm pipe 10kgf /cm2						
	PVC PIPE 25MM						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		150.000					150.000
	Total						**150.000**
						Total Quantity in metre	**150.000**
1.045	50.18.9.20.3						
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 63 mm dia Door Elbow						
	Door Elbow						
		6.000					6.000
	Total						**6.000**
						Total Quantity in no	**6.000**
1.046	50.18.9.22.3						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement-110 mm dia Door Elbow						
	Door Elbow 110mm						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.047	50.18.9.22.4						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement- 110 mm dia Bend						
	110 mm Dia Bend						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.048	50.18.9.22.6						
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 110x110x110 mm dia Door tee						
	Door Tee						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.049	50.17.1.1						
	Supplying and fixing Stainless steel soap dish including cost of materials and labour charges etc complete as per the direction of site Engineer-in-charge.						
	Soap Dish						
		10.000					10.000
	Total						**10.000**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in no	**10.000**
1.050	50.17.1.3						
	Supplying and fixing CP Towel rod 60cm or nearest available length including cost of materials and labour charges etc complete as per the direction of site Engineer-in-charge.						
	Towel Rod						
		6.000					6.000
	Total						**6.000**
						Total Quantity in no	**6.000**
1.051	50.18.9.21.7						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Vent cowl						
	Vent cowl						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.052	18.58.1.1						
	Providing and fixing PTMT grating of approved quality and colour. Circular type100 mm nominal dia						
	PTMT grating						
		10.000					10.000
	Total						**10.000**
						Total Quantity in each	**10.000**
1.053	19.4.1.1						
	Providing and fixing square-mouth S.W. gully trap class SP -1 complete with C.I. grating brick masonry chamber with water tight C.I. cover with frame of 300x300 mm size (inside) the weight of cover to be not less than 4.50 kg and frame to be not less than 2.70 kg as per standard design: 100x100 mm size P typeWith common burnt clay F.P.S. (non modular) bricks of class designation 7.5						
	Gully Trap						
		4.000					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**
1.054	18.18.2						
	Providing and fixing ball valve (brass) of approved quality, High or low pressure, with plastic floats complete:20 mm nominal bore						
	Ball valve						
		5.000					5.000
	Total						**5.000**

EST No. :HED/CEHED/EST/105/2022_5_12_11 (Edit Id : 12)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in each	**5.000**
1.055	18.51.1						
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore						
	Long body bib cock						
		20.000					20.000
	Total						**20.000**
						Total Quantity in each	**20.000**
1.056	17.31						
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.						
	Mirror						
		2.000					2.000
	Total						**2.000**
						Total Quantity in each	**2.000**
1.057	10.3						
	Providing and fixing in position collapsible steel shutters with vertical channels 20x10x2 mm and braced with flat iron diagonals 20x5 mm size, with top and bottom rail of T-iron 40x40x6 mm, with 40 mm dia steel pulleys, complete with bolts, nuts,locking arrangement, stoppers, handles, including applying a priming coat of approved steel primer .						
	Collapsible steel shutter						
		1.000	1.500		3.000		4.500
	Total						**4.500**
						Total Quantity in sqm	**4.500**
1.058	19.7.1.2						
	Constructing brick masonry manhole in cement mortar 1:4 (1 cement : 4 coarse sand) with R.C.C. top with 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size), foundation concrete 1:4:8 mix (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size,) inside plastering 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with floating coat of neat cement and making channels in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement complete as per standard design: Inside size 90x80 cm and 45 cm deep including C.I. cover with frame (light duty) 455x610 mm internal dimensions, total weight of cover and frame to be not less than 38 kg (weigh of cover 23 kg and weight of frame 15 kg):With Sewer bricks conforming to IS : 4885						
	manhole						
	manhole	1.000					1.000
	Total						**1.000**

EST No. :HED/CEHED/EST/105/2022_5_12_11 (Edit Id : 12)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in each	**1.000**
1.059	19.33						
	Constructing soak pit 1.20x1.20 m filled with brickbats including S.W. drain pipe 100 mm diameter and 1.20 m long complete as per standard design.						
	soak pit						
	soak pit	3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.060	19.15.1						
	Providing M.S. foot rests including fixing in manholes with 20x20x10 cm cement concrete blocks 1:3:6 (1 cement : 3 coarse sand: 6 graded stone aggregate 20 mm nominal size) as per standard design.With 20x20 mm square bar						
	Foot rest						
	for manhole	1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
1.061	10.2						
	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.						
	steel work						
	Courtyard LS Qty 10kg/m2	1.000	1.900		1.500	10.000 000	28.500
	LS Qty 10kg/m2	1.000	1.700		1.500	10.000 000	25.500
	Door LS Qty 10kg/m2	1.000	1.500		2.100	10.000 000	31.500
	Counter Room LS Qty 10kg/m2	1.000	2.900		1.100	10.000 000	31.900
	Total						**117.400**
						Total Quantity in kg	**117.400**

EST No. :HED/CEHED/EST/105/2022_5_9_8 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District-Construction of Approach Road to Fishing Harbour-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Approach road**			
1.001	3.15			
	Scarifying the existing bituminous road surface to a depth of 50 mm and disposal of scarified material with in all lifts and lead upto 1000 metres by Mechanical Means			
	Net Total	3135.000sqm	@5.55/sqm	17399.25
1.002	2.2			
	Clearing grass and removal of rubbish up to a distance of 50 metres outside the periphery of the area			
	Net Total	0.095Hectare	@46902.97/Hectare	4455.78
1.003	2.1.1			
	Cutting of trees, including cutting of trunks, branches and removal of stumps, roots, stacking of serviceable material with all lifts and up to a lead of 1000 metres and earth filling in the depression/pit. Girth from 300 mm to 600 mm			
	Net Total	30.000each	@603.02/each	18090.60
1.004	4.1.A.2			
	Construction of granular sub-base by providing graded Material, mixing in a mechanical mix plant at OMC, carriage of mixed Material to work site, spreading in uniform layers with a motor grader on the prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per clause 401 Grading-II - Plant Mix Method			
	Net Total	826.500cum	@3280.48/cum	2711316.72
1.005	4.12			
	Providing, laying, spreading and compacting graded stone aggregate to Wet Mix Macadam specification including premixing the Material with water at OMC in mechanical mix plant carriage of mixed Material by tipper to site, laying in uniform layers with paver in sub- base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density.			
	Net Total	826.500cum	@3183.84/cum	2631443.76
1.006	5.1.a			
	Providing and applying primer coat with bitumen emulsion (SS) on prepared surface of granular Base including clearing of road surface and spraying primer at the rate of 0.70 - 1.0 kg/sqm using mechanical means.			
	Net Total	5225.000sqm	@57.98/sqm	302945.50
1.007	5.2.b			
	Providing and applying tack coat with bitumen emulsion (RS) using emulsion			

EST No. :HED/CEHED/EST/105/2022_5_9_8 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	pressure distributor at the rate of 0.25 - 0.30 kg per sqm on the prepared Granular Surface cleaned with mechanical broom.			
	Net Total	5225.000sqm	@13.05/sqm	68186.25
1.008	5.3.2.a			
	Providing and laying bituminous macadam with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading premixed with a bituminous binder (VG 30), transported to the site, laid over a previously prepared surface with paver finisher to the required grade, level, and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction For Grading II - (19 mm nominal size)			
	Net Total	261.250cum	@7787.76/cum	2034552.30
1.009	5.2.a			
	Providing and applying tack coat with bitumen emulsion(RS) using emulsion pressure distributor at the rate of 0.20 - 0.30 kg per sqm on the prepared bituminous surface cleaned with mechanical broom.			
	Net Total	5225.000sqm	@10.79/sqm	56377.75
1.010	5.6.2.a			
	Providing and laying bituminous concrete with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with a bituminous binder(NRMB) @ 5.4 percent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level, and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 507 complete in all respects For Grading - II (13.2 mm Nominal Size)			
	Net Total	156.750cum	@12465.77/cum	1954009.45
1.011	8.13			
	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads on Bituminous Surface @ 250 gms per sqm area, the thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35. The finished surface to be level, uniform, and free from streaks and holes.			
	Net Total	300.000sqm	@494.43/sqm	148329.00
1.012	8.35			
	Providing and fixing reflective road studs (Raised Pavement Marker) of ' category A' made out of ASA/HIPS/ABS moulded body with shanks and conforming to ASTM D 4280, strong enough to support a load of more than 13.635 T when tested in accordance with ASTM D 4280, reflective panel confirming to ASTM D 788, and reflectivity conforming to clause 804.4. including installation, drilling, fixing with adhesive etc. with 2 years warranty for the road stud as well as for in field performance as per clause 804.7.3 Road Markers/Road Stud with Lense Reflector :-			
	Net Total	720.000no	@195.85/no	141012.00
			Heading Total(Rs)	10088118.36
			Total Estimation PAC	

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Sl No	Specification	Quantity	Rate	Amount
				10088118.36
Sl No	**Description**		**Percentage/LS**	**Amount**
2	**Lumsum Heading**			
2.001	Charges for Utility shifting - KSEB			
		0.00	0.00%	300000.00
2.002	Cost of Land Acquisition			
		0.00	0.00%	1000000.00
2.003	LS provision for part TS			
		0.00	0.00%	570000.00
			Total Lumsum Amount	1870000.00
3	**Extra Charges**			
2.001	Provision for GST			
		10088118.36	18.00%	1815861.30
			Grand Total	13773979.66
			Round off	26020.34
			Rounded Total(Rs)	13800000.00
	Rupees One Crore Thirty Eight Lakh			

e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

EST No. :HED/CEHED/EST/105/2022_5_9_8 (Edit Id : 4)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District-Construction of Approach Road to Fishing Harbour-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Approach road						
1.001	3.15						
	Scarifying the existing bituminous road surface to a depth of 50 mm and disposal of scarified material with in all lifts and lead upto 1000 metres by Mechanical Means						
	Existing village road 950m						
		1.000	950.000	3.300			3135.000
	Total						**3135.000**
						Total Quantity in sqm	**3135.000**
1.002	2.2						
	Clearing grass and removal of rubbish up to a distance of 50 metres outside the periphery of the area						
	for Approach Road						
		1.000	950.000	1.000		0.000100	0.095
	Total						**0.095**
						Total Quantity in Hectare	**0.095**
1.003	2.1.1						
	Cutting of trees, including cutting of trunks, branches and removal of stumps, roots, stacking of serviceable material with all lifts and up to a lead of 1000 metres and earth filling in the depression/pit. Girth from 300 mm to 600 mm						
	coconut trees						
		30.000					30.000
	Total						**30.000**
						Total Quantity in each	**30.000**
1.004	4.1.A.2						
	Construction of granular sub-base by providing graded Material, mixing in a mechanical mix plant at OMC, carriage of mixed Material to work site, spreading in uniform layers with a motor grader on the prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per clause 401 Grading-II - Plant Mix Method						
	Approach road						
		1.000	950.000	5.800	0.150		826.500
	Total						**826.500**
						Total Quantity in cum	**826.500**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.005	4.12						
	Providing, laying, spreading and compacting graded stone aggregate to Wet Mix Macadam specification including premixing the Material with water at OMC in mechanical mix plant carriage of mixed Material by tipper to site, laying in uniform layers with paver in sub- base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density.						
	for Approach Road						
		1.000	950.000	5.800	0.150		826.500
	Total						**826.500**
						Total Quantity in cum	**826.500**
1.006	5.1.a						
	Providing and applying primer coat with bitumen emulsion (SS) on prepared surface of granular Base including clearing of road surface and spraying primer at the rate of 0.70 - 1.0 kg/sqm using mechanical means.						
	for Approach Road						
		1.000	950.000	5.500			5225.000
	Total						**5225.000**
						Total Quantity in sqm	**5225.000**
1.007	5.2.b						
	Providing and applying tack coat with bitumen emulsion (RS) using emulsion pressure distributor at the rate of 0.25 - 0.30 kg per sqm on the prepared Granular Surface cleaned with mechanical broom.						
	for Approach Road						
		1.000	950.000	5.500			5225.000
	Total						**5225.000**
						Total Quantity in sqm	**5225.000**
1.008	5.3.2.a						
	Providing and laying bituminous macadam with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading premixed with a bituminous binder (VG 30), transported to the site, laid over a previously prepared surface with paver finisher to the required grade, level, and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction For Grading II - (19 mm nominal size)						
	for Approach Road-BM						
		1.000	950.000	5.500	0.050		261.250
	Total						**261.250**
						Total Quantity in cum	**261.250**
1.009	5.2.a						
	Providing and applying tack coat with bitumen emulsion(RS) using emulsion pressure distributor at the rate of 0.20 - 0.30 kg per sqm on the prepared bituminous surface cleaned with mechanical broom.						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for Approach Road						
		1.000	950.000	5.500			5225.000
	Total						**5225.000**
						Total Quantity in sqm	**5225.000**
1.010	5.6.2.a						
	Providing and laying bituminous concrete with 80-100 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with a bituminous binder(NRMB) @ 5.4 percent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level, and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 507 complete in all respects For Grading - II (13.2 mm Nominal Size)						
	for Approach Road-BC						
		1.000	950.000	5.500	0.030		156.750
	Total						**156.750**
						Total Quantity in cum	**156.750**
1.011	8.13						
	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads on Bituminous Surface @ 250 gms per sqm area, the thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35. The finished surface to be level, uniform, and free from streaks and holes.						
	for Approach Road						
	ch0-950	2.000	950.000	0.150			285.000
	zebra crossing	10.000	2.500	0.500			12.500
	Rounding	1.000			2.500		2.500
	Total						**300.000**
						Total Quantity in sqm	**300.000**
1.012	8.35						
	Providing and fixing reflective road studs (Raised Pavement Marker) of ' category A' made out of ASA/HIPS/ABS moulded body with shanks and conforming to ASTM D 4280, strong enough to support a load of more than 13.635 T when tested in accordance with ASTM D 4280, reflective panel confirming to ASTM D 788, and reflectivity conforming to clause 804.4. including installation, drilling, fixing with adhesive etc. with 2 years warranty for the road stud as well as for in field performance as per clause 804.7.3 Road Markers/Road Stud with Lense Reflector :-						
	for Approach Road						
	both side	2.000	300.000				600.000
	for zebra crossing	10*12					120.000
	Total						**720.000**
						Total Quantity in no	**720.000**

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ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasargod District- Construction of Work shop Building-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Civil work**			
1.001	2.8.1			
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil			
	Net Total	188.111cum	@291.42/cum	54819.31
1.002	50.2.3.1			
	Pumping or Bailing out water and removing slush etc by using pump set including cost of labour, oil hire charges of pumpset, etc complete			
	Net Total	50.000hour	@279.29/hour	13964.50
1.003	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	21.828cum	@6687.21/cum	145968.42
1.004	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	23.184cum	@7069.78/cum	163905.78
1.005	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	52.077cum	@9237.20/cum	481045.66
1.006	5.34.1			
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30			

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Sl No	Specification	Quantity	Rate	Amount
	grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	85.538cum	@80.55/cum	6890.09
1.007	50.2.25.1			
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge			
	Net Total	28.981cum	@515.98/cum	14953.62
1.008	4.1.6			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)			
	Net Total	8.280cum	@7076.05/cum	58589.69
1.009	60.7.2			
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.			
	Net Total	4.969cum	@2557.65/cum	12708.96
1.010	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	33.461cum	@10858.36/cum	363331.58
1.011	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	145.100sqm	@329.03/sqm	47742.25
1.012	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	148.924sqm	@800.47/sqm	119209.19
1.013	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	145.770sqm	@637.63/sqm	92947.33

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Sl No	Specification	Quantity	Rate	Amount
1.014	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	99.400sqm	@847.44/sqm	84235.54
1.015	OD5543/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR			
	Net Total	7013.440kilogram	@96.62/kilogram	677638.57
1.016	50.6.7.2			
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.			
	Net Total	68.406cum	@7872.96/cum	538557.70
1.017	21.1.1.1			
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)			
	Net Total	165.600kg	@489.70/kg	81094.32
1.018	21.3.2			
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 5.50 mm thickness			
	Net Total	12.640sqm	@1497.40/sqm	18927.14
1.019	9.116			
	Providing and fixing sliding arrangement in racks/ cupboards/cabinets shutter by with stainless steel rollers to run inside C or E aluminium channel section (The payment of C or E channel shall be made separately			
	Net Total	36.000no	@17.12/no	616.32
1.020	9.117.1			
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets			

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Sl No	Specification	Quantity	Rate	Amount
	and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 48x40 mm			
	Net Total	15.600metre	@256.03/metre	3994.07
1.021	9.118.1			
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).			
	Net Total	5.400sqm	@2033.68/sqm	10981.87
1.022	9.53			
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	56.000each	@207.00/each	11592.00
1.023	9.97.5			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:100x10 mm			
	Net Total	3.000no	@67.14/no	201.42
1.024	50.9.15.1			
	Supplying and fixing 200 mm Aluminium aldrop			
	Net Total	3.000no	@171.51/no	514.53
1.025	10.6.1			
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover			

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Sl No	Specification	Quantity	Rate	Amount
	Net Total	32.560sqm	@3400.57/sqm	110722.56
1.026	10.2			
	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.			
	Net Total	34.440kg	@117.55/kg	4048.42
1.027	50.18.9.22.8			
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement -110 mm dia Vent cowl			
	Net Total	1.000no	@123.09/no	123.09
1.028	50.18.7.4.2			
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall			
	Net Total	50.000metre	@295.71/metre	14785.50
1.029	50.18.7.6.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 10 Kfg/cm - Internal work- Exposed on wall			
	Net Total	40.000metre	@409.92/metre	16396.80
1.030	50.18.9.4.2			
	Providing and fixing PVC pipes includings joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 32 mm dia 6 Kgf/cm2			
	Net Total	40.000metre	@218.52/metre	8740.80
1.031	50.18.9.9.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2			
	Net Total	40.000metre	@521.14/metre	20845.60
1.032	50.18.9.13.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 25 mm dia 10 Kgf/cm2- External work - Exposed on wall			
	Net Total	50.000metre	@271.93/metre	13596.50
1.033	50.18.9.14.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm			

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Sl No	Specification	Quantity	Rate	Amount
	dia 6 Kgf/cm2 - External work - Exposed on wall			
	Net Total	50.000metre	@305.29/metre	15264.50
1.034	50.18.9.18.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall			
	Net Total	50.000metre	@279.39/metre	13969.50
1.035	50.18.9.19.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/ clips/ at 1.00 m spacing . This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 mm dia 6 Kgf/cm2 - External work- Exposed on wall			
	Net Total	40.000metre	@379.40/metre	15176.00
1.036	13.1.1			
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	687.425sqm	@308.22/sqm	211878.13
1.037	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	82.800sqm	@262.57/sqm	21740.80
1.038	11.36			
	Providing and fixing I st quality ceramic glazed wall tiles conforming to IS : 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer -in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3 kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.			
	Net Total	8.150sqm	@1190.03/sqm	9698.74
1.039	11.41.2			
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.			
	Net Total	95.220sqm	@1733.20/sqm	165035.30
1.040	13.48.1			
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm			
	Net Total	762.075sqm	@164.22/sqm	125147.96
1.041	13.52.1			

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Sl No	Specification	Quantity	Rate	Amount
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work			
	Net Total	106.072sqm	@219.17/sqm	23247.80
1.042	17.3.1			
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.C. pan with ISI marked white solid plastic seat and lid			
	Net Total	1.000each	@7721.48/each	7721.48
1.043	50.17.1.4			
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.			
	Net Total	1.000no	@758.07/no	758.07
1.044	17.7.3			
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 550x400 mm with a pair of 15 mm C.P. brass pillar taps			
	Net Total	3.000each	@3288.29/each	9864.87
1.045	18.51.1			
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore			
	Net Total	4.000each	@637.96/each	2551.84
1.046	18.52.1			
	Providing and fixing C.P brass stop cock (concealed) of standard design and of approved make conforming to IS: 893115 mm nominal bore			
	Net Total	5.000each	@700.27/each	3501.35
1.047	17.73.1			
	Providing and fixing PTMT towel rail complete with brackets fixed to wooden cleats with CP brass screws with concealed fitting arrangement of approved quality and colour450 mm long towel rail with total length of 495 mm, 78 mm wide and effective height of 88 mm. weighing not less than 170 gms			
	Net Total	2.000no	@641.43/no	1282.86
1.048	17.74			
	Providing and fixing PTMT shelf 440 mm long, 124 mm width and 36 mm height of approved quality and colour, weighing not less than 300 gms.			
	Net Total	1.000no	@741.89/no	741.89
1.049	18.65			

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Sl No	Specification	Quantity	Rate	Amount
	Providing and fixing PTMT Soap Dish Holder having length of 138 mm, breadth 102 mm, height of 75 mm with concealed fittings arrangements, weighing not less than 106 gms.			
	Net Total	1.000each	@150.72/each	150.72
1.050	17.71			
	Providing and fixing PTMT liquid soap container 109 mm wide, 125 mm high and 112 mm distance from wall of standard shape with bracket of the same materials with snap fittings of approved quality and colour, weighing not less than 105 gms			
	Net Total	2.000each	@183.17/each	366.34
1.051	17.31			
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.			
	Net Total	1.000each	@1481.95/each	1481.95
1.052	18.48			
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.			
	Net Total	1000.000Litre	@10.18/Litre	10180.00
			Heading Total(Rs)	3833449.23
			Total Estimation PAC	3833449.23
Sl No	**Description**		**Percentage/LS**	**Amount**
2	**Lumsum Heading**			
2.001	LS Amount for Electrification			
		0.00	0.00%	150000.00
			Total Lumsum Amount	150000.00
3	**Extra Charges**			
2.001	Provision for GST			
		3833449.23	18.00%	690020.86
			Grand Total	4673470.09
			Round off	6529.91
			Rounded Total(Rs)	4680000.00
	Rupees Forty Six Lakh Eighty Thousand			

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DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasargod District- Construction of Work shop Building-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Civil work						
1.001	2.8.1						
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil						
	Earthwork						
	Footing 2.0x2.0	16.000	2.200	2.200	1.550		120.032
	Outer wall	2.000	10.050	0.800	0.750		12.060
		2.000	9.400	0.800	0.750		11.280
	Cross wall-rooms	2.000	6.000	0.800	0.750		7.200
		5.000	2.700	0.800	0.750		8.100
	Ramp	2.000	6.000	2.900	0.150		5.220
	Septic Tank	1.000	6.000	2.500	1.500		22.500
	Soak pit	1.000	1.250	1.250	1.100		1.719
	Total						**188.111**
						Total Quantity in cum	**188.111**
1.002	50.2.3.1						
	Pumping or Bailing out water and removing slush etc by using pump set including cost of labour, oil hire charges of pumpset, etc complete						
	Pumping						
	For footing	50.000					50.000
	Total						**50.000**
						Total Quantity in hour	**50.000**
1.003	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	PCC						
	Footing 2.0x2.0	16.000	2.200	2.200	0.150		11.616
	Outer wall	2.000	10.050	0.800	0.150		2.412
		2.000	9.400	0.800	0.150		2.256
	Cross wall-rooms	2.000	6.000	0.800	0.150		1.440

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		5.000	2.700	0.800	0.150		1.620
	Septic Tank	1.000	6.000	2.500	0.150		2.250
	Soak pit	1.000	1.250	1.250	0.150		0.234
	Total						**21.828**
						Total Quantity in cum	**21.828**
1.004	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	RR masonry						
	Outer wall	2.000	10.050	0.600	0.600		7.236
		2.000	9.400	0.600	0.600		6.768
	Cross wall-rooms	2.000	6.000	0.600	0.600		4.320
		5.000	2.700	0.600	0.600		4.860
	Total						**23.184**
						Total Quantity in cum	**23.184**
1.005	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	RCC- upto plinth level						
	Footing	16.000	2.000	2.000	0.200		12.800
		16.000	1/3	(2*2)+(0.5*0.5)+(2*0.5)	0.200		5.600
	Footing pedestal	0.950	0.500	0.500	1.000		0.238
	Plinth beam	2.000	10.050	0.450	0.450		4.070
	Short wall	2.000	9.400	0.450	0.450		3.807
	Cross wall-rooms	2.000	6.000	0.450	0.450		2.430
		5.000	2.700	0.450	0.450		2.734
	Ramp	2.000	6.000	2.900	(0.60+0.15)/2		13.050
	Soak pit	1.000	4*1.25	0.200	1.000		1.000
	Septic Tank -bed slab	1.000	6.000	2.500	0.150		2.250

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Septic Tank -side wall	2.000	2.100	0.200	1.100		0.924
	Septic Tank -side wall	2.000	0.600	0.200	1.100		0.264
	Septic Tank - baffle wall	2.000	2.100	0.150	0.800		0.504
	Septic Tank - cover slab	1.000	6.000	2.500	0.150		2.250
	Soak pit -cover slab	1.000	1.250	1.250	0.100		0.156
	Total						**52.077**
						Total Quantity in cum	**52.077**
1.006	5.34.1						
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	RCC- upto plinth level						
	Footing	16.000	2.000	2.000	0.200		12.800
		16.000	1/3	(2*2)+(0.5*0.5)+(2*0.5)	0.200		5.600
	Footing pedestal	0.950	0.500	0.500	1.000		0.238
	Plinth beam	2.000	10.050	0.450	0.450		4.070
	Short wall	2.000	9.400	0.450	0.450		3.807
	Cross wall-rooms	2.000	6.000	0.450	0.450		2.430
		5.000	2.700	0.450	0.450		2.734
	Ramp	2.000	6.000	2.900	(0.60+0.15)/2		13.050
	Soak pit	1.000	4*1.25	0.200	1.000		1.000
	Septic Tank -bed slab	1.000	6.000	2.500	0.150		2.250
	Septic Tank -side wall	2.000	2.100	0.200	1.100		0.924
	Septic Tank -side wall	2.000	0.600	0.200	1.100		0.264
	Septic Tank - baffle wall	2.000	2.100	0.150	0.800		0.504
	Septic Tank - cover slab	1.000	6.000	2.500	0.150		2.250
	Soak pit -cover slab	1.000	1.250	1.250	0.100		0.156
	Total						**52.077**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Lintel						
	Outer wall	4.000	9.800	0.200	0.150		1.176
	Cross wall-rooms	2.000	6.000	0.200	0.150		0.360
		5.000	2.700	0.200	0.150		0.405
	Total						**1.941**
	Beam						
	longitudinal	12.000	2.900	0.300	0.350		3.654
	transverse	12.000	2.800	0.300	0.350		3.528
	Total						**7.182**
	Roof slab						
	Roof slab	1.000	10.400	10.400	0.120		12.979
	Deduct crane room	-1.000	3.000	3.000	0.120		-1.080
	crane room slab	1.000	4.000	4.000	0.120		1.920
	Total						**13.819**
	Sunshade						
	Outer wall	4.000	9.800	0.600	(0.1+0.07)/2		1.999
	Total						**1.999**
	Columns						
	Columns	12.000	0.300	0.400	4.100		5.904
	Columns for crane room	4.000	0.300	0.400	5.450		2.616
	Total						**8.520**
						Total Quantity in cum	**85.538**
1.007	50.2.25.1						
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge						
	Filling						
	shop & workshop rooms	3.000	3.000	3.000	0.350		9.450
	office room	1.000	1.750	3.000	0.350		1.838
	workspace	1.000	3.000	9.400	0.350		9.870
	toilet	1.000	1.050	1.200	0.350		0.441
	passage+ crane facility	1.000	6.400	3.000	0.350		6.720
	passage to w/c	1.000	1.050	1.800	0.350		0.662
	Total						**28.981**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**28.981**
1.008	4.1.6						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)						
	CC Flooring						
	shop & workshop rooms	3.000	3.000	3.000	0.100		2.700
	office room	1.000	1.750	3.000	0.100		0.525
	workspace	1.000	3.000	9.400	0.100		2.820
	toilet	1.000	1.050	1.200	0.100		0.126
	passage+ crane facility	1.000	6.400	3.000	0.100		1.920
	passage to w/c	1.000	1.050	1.800	0.100		0.189
	Total						**8.280**
						Total Quantity in cum	**8.280**
1.009	60.7.2						
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.						
	DR packing						
	Septic tank	1.000	6.000	2.500	0.300		4.500
	Soak pit	1.000	1.250	1.250	0.300		0.469
	Total						**4.969**
						Total Quantity in cum	**4.969**
1.010	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	Lintel						
	Outer wall	4.000	9.800	0.200	0.150		1.176
	Cross wall-rooms	2.000	6.000	0.200	0.150		0.360
		5.000	2.700	0.200	0.150		0.405
	Total						**1.941**
	Beam						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	longitudinal	12.000	2.900	0.300	0.350		3.654
	transverse	12.000	2.800	0.300	0.350		3.528
	Total						**7.182**
	Roof slab						
	Roof slab	1.000	10.400	10.400	0.120		12.979
	Deduct crane room	-1.000	3.000	3.000	0.120		-1.080
	crane room slab	1.000	4.000	4.000	0.120		1.920
	Total						**13.819**
	Sunshade						
	Outer wall	4.000	9.800	0.600	(0.1+0.07)/2		1.999
	Total						**1.999**
	Columns						
	Columns	12.000	0.300	0.400	4.100		5.904
	Columns for crane room	4.000	0.300	0.400	5.450		2.616
	Total						**8.520**
						Total Quantity in cum	**33.461**
1.011	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	Footing & foundations						
	Footing PCC	4*16	2.200		0.150		21.120
	Footing RCC	4*16	2.000		0.200		25.600
	Pedestal	4*16	0.500		1.000		32.000
	Septic Tank-bed slab	1.000	6+2.5		0.150		1.275
	Soak pit-bed slab	1.000	1.250+1.250		0.150		0.375
	Septic Tank -side wall	2*2	2.1+6		1.100		35.640
	Septic Tank - baffle wall	2*2	2.100		0.800		6.720
	Septic Tank - cover slab	2.000	6+2.5		0.150		2.550
	Soak pit -cover slab	4.000	1.250		0.100		0.500
	Outer wall	2*2.000	10.050		0.150		6.030

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		2*2.000	9.400		0.150		5.640
	Cross wall-rooms	2*2.000	6.000		0.150		3.600
		2*5.000	2.700		0.150		4.050
	Total						**145.100**
						Total Quantity in sqm	**145.100**
1.012	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Slabs						
	Roof slab	1.000	10.400	10.400			108.160
		4.000	10.400		0.120		4.992
	Deduct crane room	-1.000	3.000	3.000			-9.000
	crane room slab	1.000	4.000	4.000			16.000
		4.000	4.000		0.120		1.920
	Total						**122.072**
	Sunshade						
	sunshade	4.000	9.800	0.600			23.520
		4.000	9.800		(0.1+0.07)/2		3.332
	Total						**26.852**
						Total Quantity in sqm	**148.924**
1.013	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	Plinth beam						
	Outer wall	2*2.000	10.050		0.450		18.090
		2*2.000	9.400		0.450		16.920
	Cross wall-rooms	2*2.000	6.000		0.450		10.800
		2*5.000	2.700		0.450		12.150
	Total						**57.960**
	Lintel						
	Outer wall	2*4.000	9.800		0.150		11.760

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Cross wall-rooms	2*2.000	6.000		0.150		3.600
		2*5.000	2.700		0.150		4.050
	Total						**19.410**
	Beams						
	longitudinal	12.000	2.900	0.300			10.440
	longitudinal	2*12.000	2.900		0.350		24.360
	transverse	12.000	2.800	0.300			10.080
	transverse	2*12.000	2.800		0.350		23.520
	Total						**68.400**
						Total Quantity in sqm	**145.770**
1.014	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	Columns						
	Columns	12.000	(0.300+0.4)*2		4.100		68.880
	Columns for crane room	4.000	(0.300+0.4)*2		5.450		30.520
	Total						**99.400**
						Total Quantity in sqm	**99.400**
1.015	OD5543/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR						
	Steel						
	LS Qty-80kg/m3 For item no.5	52.077				80.000000	4166.160
	For item no.10	8.520				100.000000	852.000
	For item no.10	24.941				80.000000	1995.280
	Total						**7013.440**
						Total Quantity in kilogram	**7013.440**
1.016	50.6.7.2						
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.						
	Laterite masonry						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Outer wall	2.000	10.050	0.200	4.100		16.482
		1.000	9.400	0.200	4.100		7.708
	Cross wall-rooms	2.000	6.000	0.200	4.100		9.840
		5.000	2.700	0.200	4.100		11.070
	additional height for crane room	1.000	9.000	0.200	5.45-4.100		2.430
	Parapet wall	4.000	10.100		0.800		32.320
	deductions- RS1	-2.000	1.500	0.200	3.700		-2.220
	deductions- RS2	-2.000	2.900	0.200	3.700		-4.292
	deductions- Door D	-2.000	1.100	0.200	2.100		-0.924
	deductions- Door D1	-1.000	0.800	0.200	2.100		-0.336
	deductions- Window W	-6.000	1.500	0.200	1.500		-2.700
	deductions- Window W1	-3.000	1.000	0.200	1.500		-0.900
	deductions- Ventilator V	-1.000	0.600	0.200	0.600		-0.072
	Total						**68.406**
						Total Quantity in cum	**68.406**
1.017	21.1.1.1						
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)						
	Aluminium window						
	Window frame, W	6.000	4*(1.5+.8)			2.000000	110.400
	Window frame, W1	3.000	4*(1.5+.6)			2.000000	50.400
	ventilator V	1.000	4*0.600			2.000000	4.800
	Total						**165.600**
						Total Quantity in kg	**165.600**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.018	21.3.2						
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 5.50 mm thickness						
	Glazing						
	Window W	2*6	1.300	0.600			9.360
	Window W1	2*3	1.300	0.400			3.120
	ventilator V	1.000	0.400	0.400			0.160
	Total						**12.640**
						Total Quantity in sqm	**12.640**
1.019	9.116						
	Providing and fixing sliding arrangement in racks/ cupboards/cabinets shutter by with stainless steel rollers to run inside C or E aluminium channel section (The payment of C or E channel shall be made separately						
	Sliding arrangement						
	Windows	4*9					36.000
	Total						**36.000**
						Total Quantity in no	**36.000**
1.020	9.117.1						
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 48x40 mm						
	frame						
	Door D	2*2	2.100				8.400
	Door D	1*2	1.100				2.200
	Door D1	2*1.000	2.100				4.200
	Door D1	1.000	0.800				0.800
	Total						**15.600**
						Total Quantity in metre	**15.600**
1.021	9.118.1						

EST No. :HED/CEHED/EST/105/2022_5_14_13 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).						
	Shutter						
	D	2.000	1.000		2.000		4.000
	D1	1.000	0.700		2.000		1.400
	Total						**5.400**
						Total Quantity in sqm	**5.400**
1.022	9.53						
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	Hold fast						
	Door	3*6				1.000000	18.000
	Window	9*4				1.000000	36.000
	V	1*2				1.000000	2.000
	Total						**56.000**
						Total Quantity in each	**56.000**
1.023	9.97.5						
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:100x10 mm						
	Tower bolt						
	Doors	3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.024	50.9.15.1						
	Supplying and fixing 200 mm Aluminium aldrop						

EST No. :HED/CEHED/EST/105/2022_5_14_13 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Aluminium aldrop						
	For doors	3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.025	10.6.1						
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover						
	Rolling shutter						
	RS1	2.000	1.500		3.700		11.100
	RS2	2.000	2.900		3.700		21.460
	Total						**32.560**
						Total Quantity in sqm	**32.560**
1.026	10.2						
	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.						
	Grill						
	LS Qty 10kg/m2	3.000	2.800		4.100		34.440
	Total						**34.440**
						Total Quantity in kg	**34.440**
1.027	50.18.9.22.8						
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement -110 mm dia Vent cowl						
	Vent cowl						
	For toilet	1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.028	50.18.7.4.2						
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall						
	PVC Pipe						
	32mm	50.000					50.000
	Total						**50.000**

EST No. :HED/CEHED/EST/105/2022_5_14_13 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in metre	**50.000**
1.029	50.18.7.6.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 10 Kfg/cm - Internal work- Exposed on wall						
	PVC Pipe						
	50mm	40.000					40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.030	50.18.9.4.2						
	Providing and fixing PVC pipes includings joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 32 mm dia 6 Kgf/cm2						
	PVC Pipe						
	32mm	40.000					40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.031	50.18.9.9.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2						
	PVC Pipe						
	110mm	40.000					40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.032	50.18.9.13.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 25 mm dia 10 Kgf/cm2- External work - Exposed on wall						
	PVC Pipe						
	25mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.033	50.18.9.14.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - External work - Exposed on wall						

EST No. :HED/CEHED/EST/105/2022_5_14_13 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	PVC Pipe						
	32mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.034	50.18.9.18.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall						
	PVC Pipe						
	75mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.035	50.18.9.19.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/ clips/ at 1.00 m spacing . This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 mm dia 6 Kgf/cm2 - External work- Exposed on wall						
	PVC Pipe						
	110mm	40.000					40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.036	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	Plastering						
	Outer wall	2*2.000	10.050		4.100		164.820
		2*1.000	9.400		4.100		77.080
	Cross wall-rooms	2*2.000	6.000		4.100		98.400
		2*5.000	2.700		4.100		110.700
	additional height for crane room	2*1.000	9.000		5.45-4.100		24.300
	Parapet wall	2*4.000	10.100		0.800+.8+.10		137.360
	Sunshade	2*4.000	9.800	0.600			47.040
	Plinth beam	2.000	10.050		0.450		9.045
		2.000	9.400		0.450		8.460

EST No. :HED/CEHED/EST/105/2022_5_14_13 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	LS for beam and column projections	100.000					100.000
	deductions- RS1	-2*2.000	1.500		3.700		-22.200
	deductions- RS2	-2*2.000	2.900		3.700		-42.920
	deductions- Door D	-2.000	1.100		2.100		-4.620
	deductions- Door D1	-1.000	0.800		2.100		-1.680
	deductions- Window W	-6.000	1.500		1.500		-13.500
	deductions- Window W1	-3.000	1.000		1.500		-4.500
	deductions- Ventilator V	-1.000	0.600		0.600		-0.360
	Total						**687.425**
						Total Quantity in sqm	**687.425**
1.037	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	Ceiling plastering						
	shop & workshop rooms	3.000	3.000	3.000			27.000
	office room	1.000	1.750	3.000			5.250
	workspace	1.000	3.000	9.400			28.200
	toilet	1.000	1.050	1.200			1.260
	passage+ crane facility	1.000	6.400	3.000			19.200
	passage to w/c	1.000	1.050	1.800			1.890
	Total						**82.800**
						Total Quantity in sqm	**82.800**
1.038	11.36						
	Providing and fixing I st quality ceramic glazed wall tiles conforming to IS : 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer -in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3 kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.						
	Wall tiles						

EST No. :HED/CEHED/EST/105/2022_5_14_13 (Edit Id : 5)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	w/c	1.000	2*(1.05+ 1.2)		1.500		6.750
	Wash area	1.000	2.000		0.700		1.400
	Total						**8.150**
						Total Quantity in sqm	**8.150**
1.039	11.41.2						
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.						
	Floor Tile						
	shop & workshop rooms	3.000	3.000	3.000			27.000
	office room	1.000	1.750	3.000			5.250
	workspace	1.000	3.000	9.400			28.200
	toilet	1.000	1.050	1.200			1.260
	passage+ crane facility	1.000	6.400	3.000			19.200
	passage to w/c	1.000	1.050	1.800			1.890
	For Skirting - 15% of floor area	82.800				0.150000	12.420
	Total						**95.220**
						Total Quantity in sqm	**95.220**
1.040	13.48.1						
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm						
	Painting						
	ceiling- shop & workshop rooms	3.000	3.000	3.000			27.000
	office room	1.000	1.750	3.000			5.250
	workspace	1.000	3.000	9.400			28.200
	toilet	1.000	1.050	1.200			1.260
	passage+ crane facility	1.000	6.400	3.000			19.200
	passage to w/c	1.000	1.050	1.800			1.890
	Outer wall	2*2.000	10.050		4.100		164.820
		2*1.000	9.400		4.100		77.080

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Cross wall-rooms	2*2.000	6.000		4.100		98.400
		2*5.000	2.700		4.100		110.700
	additional height for crane room	2*1.000	9.000		5.45-4.100		24.300
	Parapet wall	2*4.000	10.100		0.800+.8+.10		137.360
	Sunshade	2*4.000	9.800	0.600			47.040
	Plinth beam	2.000	10.050		0.450		9.045
		2.000	9.400		0.450		8.460
	LS for beam and column projections	100.000					100.000
	deductions- RS1	-2*2.000	1.500		3.700		-22.200
	deductions- RS2	-2*2.000	2.900		3.700		-42.920
	deductions- Door D	-2.000	1.100		2.100		-4.620
	deductions- Door D1	-1.000	0.800		2.100		-1.680
	deductions- Window W	-6.000	1.500		1.500		-13.500
	deductions- Window W1	-3.000	1.000		1.500		-4.500
	deductions- Ventilator V	-1.000	0.600		0.600		-0.360
	deductions-wall tile w/c	-1.000	2*(1.05+1.2)		1.500		-6.750
	deductions-Wash area	-1.000	2.000		0.700		-1.400
	Total						**762.075**
						Total Quantity in sqm	**762.075**
1.041	13.52.1						
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work						
	Epoxy paint						
	RS1	2*2.000	1.500		3.700	1.100000	24.420

EST No. :HED/CEHED/EST/105/2022_5_14_13 (Edit Id : 5)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	RS2	2*2.000	2.900		3.700	1.100000	47.212
	Grill	3.000	2.800		4.100	1.000000	34.440
	Total						**106.072**
						Total Quantity in sqm	**106.072**
1.042	17.3.1						
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.C. pan with ISI marked white solid plastic seat and lid						
	WC						
	Water Closet	1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
1.043	50.17.1.4						
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.						
	Health Faucet						
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.044	17.7.3						
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 550x400 mm with a pair of 15 mm C.P. brass pillar taps						
	Wash basin						
	Wash basin	3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.045	18.51.1						
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore						
	Bib cock						
	Bib cock	4.000					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**

EST No. :HED/CEHED/EST/105/2022_5_14_13 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.046	18.52.1						
	Providing and fixing C.P brass stop cock (concealed) of standard design and of approved make conforming to IS: 893115 mm nominal bore						
	Stop cock						
	For Health faucet and water closet	2.000					2.000
	For wash basin	3.000					3.000
	Total						**5.000**
						Total Quantity in each	**5.000**
1.047	17.73.1						
	Providing and fixing PTMT towel rail complete with brackets fixed to wooden cleats with CP brass screws with concealed fitting arrangement of approved quality and colour450 mm long towel rail with total length of 495 mm, 78 mm wide and effective height of 88 mm. weighing not less than 170 gms						
	Towel rail						
	For w/c & wash area	2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.048	17.74						
	Providing and fixing PTMT shelf 440 mm long, 124 mm width and 36 mm height of approved quality and colour, weighing not less than 300 gms.						
	PTMT Shelf						
	For Toilet	1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.049	18.65						
	Providing and fixing PTMT Soap Dish Holder having length of 138 mm, breadth 102 mm, height of 75 mm with concealed fittings arrangements, weighing not less than 106 gms.						
	Soap dish						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
1.050	17.71						
	Providing and fixing PTMT liquid soap container 109 mm wide, 125 mm high and 112 mm distance from wall of standard shape with bracket of the same materials with snap fittings of approved quality and colour, weighing not less than 105 gms						
	Fixing liquid soap container						

EST No. :HED/CEHED/EST/105/2022_5_14_13 (Edit Id : 5)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	liquid soap container	2.000					2.000
	Total						**2.000**
						Total Quantity in each	**2.000**
1.051	17.31						
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.						
	Fixing mirror						
	mirror	1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
1.052	18.48						
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.						
	Water tank						
	Water tank	1.000	1000.000				1000.000
	Total						**1000.000**
						Total Quantity in Litre	**1000.000**

EST No. :HED/CEHED/EST/105/2022_5_13_12 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of office room cum harbour surveillance camera room-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Civil work**			
1.001	2.8.1			
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil			
	Net Total	293.071cum	@291.42/cum	85406.75
1.002	50.2.3.1			
	Pumping or Bailing out water and removing slush etc by using pump set including cost of labour, oil hire charges of pumpset, etc complete			
	Net Total	50.000hour	@279.29/hour	13964.50
1.003	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	36.210cum	@6687.21/cum	242143.87
1.004	7.1.1			
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	43.200cum	@7069.78/cum	305414.50
1.005	50.2.25.1			
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge			
	Net Total	118.566cum	@515.98/cum	61177.68
1.006	4.1.6			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)			
	Net Total	26.348cum	@7076.05/cum	186439.77
1.007	60.7.2			

EST No. :HED/CEHED/EST/105/2022_5_13_12 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.			
	Net Total	4.969cum	@2557.65/cum	12708.96
1.008	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	71.603cum	@9237.20/cum	661411.23
1.009	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	90.338cum	@10858.36/cum	980922.53
1.010	5.34.1			
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	161.941cum	@80.55/cum	13044.35
1.011	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	235.330sqm	@329.03/sqm	77430.63
1.012	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	466.424sqm	@800.47/sqm	373358.42
1.013	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	342.073sqm	@637.63/sqm	218116.01

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Sl No	Specification	Quantity	Rate	Amount
1.014	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	171.640sqm	@847.44/sqm	145454.60
1.015	5.9.7			
	Centering and shuttering including strutting, etc. and removal of form for:Stairs, (excluding landings) except spiral - staircases)			
	Net Total	5.445sqm	@718.82/sqm	3913.97
1.016	OD5511/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR			
	Net Total	12987.040kilogram	@96.62/kilogram	1254807.80
1.017	50.6.7.2			
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.			
	Net Total	89.888cum	@7872.96/cum	707684.63
1.018	21.1.1.1			
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)			
	Net Total	539.600kg	@489.70/kg	264242.12
1.019	21.2.2			
	Providing and fixing 12 mm thick prelaminated particle board flat pressed three layer or graded wood particle board conforming to IS : 12823 Grade I Type II, in panelling fixed in aluminum doors, windows shutters and partition frames with C.P. brass / stainless steel screws etc. complete as per architectural drawings and directions of Engineer - in- Charge.Pre- laminated particle board with decorative lamination on both sides			
	Net Total	5.400sqm	@1209.19/sqm	6529.63
1.020	21.3.2			
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of			

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Sl No	Specification	Quantity	Rate	Amount
	aluminium snap beading shall be paid in basic item):With float glass panes of 5.50 mm thickness			
	Net Total	60.400sqm	@1497.40/sqm	90442.96
1.021	9.116			
	Providing and fixing sliding arrangement in racks/ cupboards/cabinets shutter by with stainless steel rollers to run inside C or E aluminium channel section (The payment of C or E channel shall be made separately			
	Net Total	48.000no	@17.12/no	821.76
1.022	9.117.1			
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 48x40 mm			
	Net Total	15.000metre	@256.03/metre	3840.45
1.023	9.118.1			
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).			
	Net Total	4.800sqm	@2033.68/sqm	9761.66
1.024	9.53			
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	96.000each	@207.00/each	19872.00
1.025	9.97.5			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:100x10 mm			
	Net Total	12.000no	@67.14/no	805.68

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Sl No	Specification	Quantity	Rate	Amount
1.026	9.88			
	Providing and fixing chromium plated brass 100 mm mortice latch and lock with 6 levers and a pair of lever handles of approved quality with necessary screws etc. complete.			
	Net Total	7.000no	@931.47/no	6520.29
1.027	50.9.15.1			
	Supplying and fixing 200 mm Aluminium aldrop			
	Net Total	3.000no	@171.51/no	514.53
1.028	10.6.1			
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover			
	Net Total	23.385sqm	@3400.57/sqm	79522.33
1.029	50.18.9.22.8			
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement -110 mm dia Vent cowl			
	Net Total	3.000no	@123.09/no	369.27
1.030	50.18.7.4.2			
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall			
	Net Total	60.000metre	@295.71/metre	17742.60
1.031	50.18.7.6.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 10 Kfg/cm - Internal work- Exposed on wall			
	Net Total	50.000metre	@409.92/metre	20496.00
1.032	50.18.9.4.2			
	Providing and fixing PVC pipes includings joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 32 mm dia 6 Kgf/cm2			
	Net Total	50.000metre	@218.52/metre	10926.00
1.033	50.18.9.9.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2			

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Sl No	Specification	Quantity	Rate	Amount
	Net Total	50.000metre	@521.14/metre	26057.00
1.034	50.18.9.13.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 25 mm dia 10 Kgf/cm2- External work - Exposed on wall			
	Net Total	50.000metre	@271.93/metre	13596.50
1.035	50.18.9.14.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - External work - Exposed on wall			
	Net Total	50.000metre	@305.29/metre	15264.50
1.036	50.18.9.18.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall			
	Net Total	50.000metre	@279.39/metre	13969.50
1.037	50.18.9.19.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/ clips/ at 1.00 m spacing . This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 mm dia 6 Kgf/cm2 - External work- Exposed on wall			
	Net Total	40.000metre	@379.40/metre	15176.00
1.038	13.1.1			
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	1063.447sqm	@308.22/sqm	327775.63
1.039	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	551.830sqm	@262.57/sqm	144894.00
1.040	11.36			
	Providing and fixing I st quality ceramic glazed wall tiles conforming to IS : 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer -in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3 kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.			
	Net Total	25.700sqm	@1190.03/sqm	30583.77
1.041	11.41.2			
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS :			

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Sl No	Specification	Quantity	Rate	Amount
	15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.			
	Net Total	361.322sqm	@1733.20/sqm	626243.29
1.042	13.47.1			
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)			
	Net Total	553.507sqm	@186.15/sqm	103035.33
1.043	13.48.1			
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm			
	Net Total	1036.070sqm	@164.22/sqm	170143.42
1.044	13.52.1			
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work			
	Net Total	51.447sqm	@219.17/sqm	11275.64
1.045	10.28			
	Providing and fixing stainless steel (Grade 304) railing made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners, stainless steel bolts etc., of required size on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.)			
	Net Total	77.480kg	@664.68/kg	51499.41
1.046	17.3.1			
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.C. pan with ISI marked white solid plastic seat and lid			
	Net Total	3.000each	@7721.48/each	23164.44
1.047	50.17.1.4			
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.			
	Net Total	3.000no	@758.07/no	2274.21
1.048	17.7.3			

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Sl No	Specification	Quantity	Rate	Amount
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 550x400 mm with a pair of 15 mm C.P. brass pillar taps			
	Net Total	3.000each	@3288.29/each	9864.87
1.049	18.51.1			
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore			
	Net Total	6.000each	@637.96/each	3827.76
1.050	18.52.1			
	Providing and fixing C.P brass stop cock (concealed) of standard design and of approved make conforming to IS: 893115 mm nominal bore			
	Net Total	9.000each	@700.27/each	6302.43
1.051	17.73.1			
	Providing and fixing PTMT towel rail complete with brackets fixed to wooden cleats with CP brass screws with concealed fitting arrangement of approved quality and colour450 mm long towel rail with total length of 495 mm, 78 mm wide and effective height of 88 mm. weighing not less than 170 gms			
	Net Total	2.000no	@641.43/no	1282.86
1.052	21.12.2			
	Providing and fixing aluminium tubular handle bar 32 mm outer dia, 3.0mm thick & 2100 mm long with S.S. screws etc. complete as per direction of Engineer -in-Charge.Powder coated minimum thickness 50 micron aluminium tubular handle bar			
	Net Total	14.000no	@649.84/no	9097.76
1.053	17.74			
	Providing and fixing PTMT shelf 440 mm long, 124 mm width and 36 mm height of approved quality and colour, weighing not less than 300 gms.			
	Net Total	3.000no	@741.89/no	2225.67
1.054	18.65			
	Providing and fixing PTMT Soap Dish Holder having length of 138 mm, breadth 102 mm, height of 75 mm with concealed fittings arrangements, weighing not less than 106 gms.			
	Net Total	4.000each	@150.72/each	602.88
1.055	17.71			
	Providing and fixing PTMT liquid soap container 109 mm wide, 125 mm high and 112 mm distance from wall of standard shape with bracket of the same materials with snap fittings of approved quality and colour, weighing not less than 105 gms			
	Net Total	2.000each	@183.17/each	366.34
1.056	17.10.1.2			
	Providing and fixing Stainless Steel A ISI 304 (18/8) kitchen sink as per IS 13983 with C.I. brackets and stainless steel plug 40 mm, including painting of fittings and brackets, cutting and making good the walls wherever required:			

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Sl No	Specification	Quantity	Rate	Amount
	Kitchen sink with drain board510x 1040 mm bowl depth 225 mm			
	Net Total	1.000each	@6758.95/each	6758.95
1.057	17.31			
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.			
	Net Total	2.000each	@1481.95/each	2963.90
1.058	18.48			
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.			
	Net Total	1000.000Litre	@10.18/Litre	10180.00
1.059	8.2.2.2			
	Providing and fixing 18 mm thick gang saw cut, mirror, polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations, of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.Area of slab over 0.50 sqm			
	Net Total	0.700sqm	@4629.02/sqm	3240.31
1.060	16.21			
	Engraving letters in hard stone			
	Net Total	400.000per Letter per cm height	@9.46/per Letter per cm height	3784.00
1.061	13.71			
	Lettering with black Japan pint of approved brand and manufacture			
	Net Total	600.000per Letter per cm height	@5.47/per Letter per cm height	3282.00
			Heading Total(Rs)	7514539.85
			Total Estimation PAC	7514539.85
3	**Extra Charges**			
2.001	Provision for GST			
		7514539.85	18.00%	1352617.17
			Grand Total	8867157.02
			Round off	32842.98
			Rounded Total(Rs)	8900000.00
	Rupees Eighty Nine Lakh			

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DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Construction of office room cum harbour surveillance camera room-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Civil work						
1.001	2.8.1						
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil						
	Earth work						
	Footing 2.0x2.0	26.000	2.200	2.200	1.550		195.052
	Long wall	3.000	21.500	0.800	0.750		38.700
	Short wall	3.000	13.000	0.800	0.750		23.400
	Cross wall-rooms	3.000	4.000	0.800	0.750		7.200
	Toilet	3.000	1.500	0.800	0.750		2.700
	Step	1.000	5.000	0.600	0.150		0.450
	Ramp	1.000	6.000	1.500	0.150		1.350
	Septic Tank	1.000	6.000	2.500	1.500		22.500
	Soak pit	1.000	1.250	1.250	1.100		1.719
	Total						**293.071**
						Total Quantity in cum	**293.071**
1.002	50.2.3.1						
	Pumping or Bailing out water and removing slush etc by using pump set including cost of labour, oil hire charges of pumpset, etc complete						
	Pumping						
	For footing	50.000					50.000
	Total						**50.000**
						Total Quantity in hour	**50.000**
1.003	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	PCC						
	Footing 2.0x2.0	26.000	2.200	2.200	0.150		18.876
	Long wall	3.000	21.500	0.800	0.150		7.740

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Short wall	3.000	13.000	0.800	0.150		4.680
	Cross wall-rooms	3.000	4.000	0.800	0.150		1.440
	Toilet	3.000	1.500	0.800	0.150		0.540
	Step	1.000	5.000	0.600	0.150		0.450
	Septic Tank	1.000	6.000	2.500	0.150		2.250
	Soak pit	1.000	1.250	1.250	0.150		0.234
	Total						**36.210**
						Total Quantity in cum	**36.210**
1.004	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	RR masonry						
	Long wall	3.000	21.500	0.600	0.600		23.220
	Short wall	3.000	13.000	0.600	0.600		14.040
	Cross wall-rooms	3.000	4.000	0.600	0.600		4.320
	Toilet	3.000	1.500	0.600	0.600		1.620
	Total						**43.200**
						Total Quantity in cum	**43.200**
1.005	50.2.25.1						
	Filling with contractor's own earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m as per direction of site Engineer-in-charge						
	Filling						
	Entrance and stair room	1.000	13.000	3.600	0.450		21.060
	office room	1.000	4.000	6.000	0.450		10.800
	store room	1.000	4.000	4.000	0.450		7.200
	rest room	1.000	4.000	4.000	0.450		7.200
	toilet	2.000	1.500	1.200	0.450		1.620
	wash area	1.000	2.200	2.600	0.450		2.574
	cabin side	1.000	8.800	17.200	0.450		68.112
	Total						**118.566**
						Total Quantity in cum	**118.566**
1.006	4.1.6						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size)						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	CC Flooring						
	Entrance and stair room	1.000	13.000	3.600	0.100		4.680
	office room	1.000	4.000	6.000	0.100		2.400
	store room	1.000	4.000	4.000	0.100		1.600
	rest room	1.000	4.000	4.000	0.100		1.600
	toilet	2.000	1.500	1.200	0.100		0.360
	wash area	1.000	2.200	2.600	0.100		0.572
	cabin side	1.000	8.800	17.200	0.100		15.136
	Total						**26.348**
						Total Quantity in cum	**26.348**
1.007	60.7.2						
	DR PACKING Under foundation - Dry stone packing under foundation with good quality blasted rubble including conveyance of material and labour charges etc. complete as per direction of departmental officers at site.						
	DR packing						
	Septic tank	1.000	6.000	2.500	0.300		4.500
	Soak pit	1.000	1.250	1.250	0.300		0.469
	Total						**4.969**
						Total Quantity in cum	**4.969**
1.008	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	RCC- upto plinth level						
	Footing	26.000	2.000	2.000	0.200		20.800
		26.000	1/3	(2*2)+(0.5*0.5)+(2*0.5)	0.200		9.100
	Footing pedestal	26.000	0.500	0.500	1.000		6.500
	Stair bottom slab	1.000	1.500	1.000	0.120		0.180
	Plinth beam-Long wall	3.000	21.500	0.450	0.450		13.061
	Short wall	3.000	13.000	0.450	0.450		7.898
	Cross wall-rooms	3.000	4.000	0.450	0.450		2.430

EST No. :HED/CEHED/EST/105/2022_5_13_12 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Toilet	3.000	1.500	0.450	0.450		0.911
	Ramp	1.000	6.000	1.500	(0.60+0.15)/2		3.375
	Soak pit	1.000	4*1.25	0.200	1.000		1.000
	Septic Tank -bed slab	1.000	6.000	2.500	0.150		2.250
	Septic Tank -side wall	2.000	2.100	0.200	1.100		0.924
	Septic Tank -side wall	2.000	0.600	0.200	1.100		0.264
	Septic Tank - baffle wall	2.000	2.100	0.150	0.800		0.504
	Septic Tank - cover slab	1.000	6.000	2.500	0.150		2.250
	Soak pit -cover slab	1.000	1.250	1.250	0.100		0.156
	Total						**71.603**
						Total Quantity in cum	**71.603**
1.009	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	Columns						
	GF	24.000	0.300	0.400	3.300		9.504
	Porch	2.000	0.300	0.400	3.300		0.792
	FF	8.000	0.300	0.400	3.000		2.880
	FF	16.000	0.300	0.400	0.800		1.536
	Total						**14.712**
	Lintel						
	GF-Long wall	3.000	21.500	0.200	0.150		1.935
	Short wall	3.000	13.000	0.200	0.150		1.170
	Cross wall-rooms	3.000	4.000	0.200	0.150		0.360
	Toilet	3.000	2.700	0.200	0.150		0.243
		1.000	5.000	0.300	0.150		0.225
	FF- Long wall	2.000	13.000	0.200	0.150		0.780
	Short wall	2.000	3.600	0.200	0.150		0.216

EST No. :HED/CEHED/EST/105/2022_5_13_12 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**4.929**
	Beam						
	longitudinal	6+2	3.850	0.300	0.350		3.234
		6+2	3.600	0.300	0.350		3.024
		7+2	4.750	0.300	0.350		4.489
	transverse	4+4	3.500	0.300	0.350		2.940
		8.000	5.800	0.300	0.350		4.872
		4.000	2.300	0.300	0.350		0.966
	porch	2.000	4.400	0.300	0.350		0.924
	Total						**20.449**
	Roof slab						
	GF	1.000	22.000	13.600	0.120		35.904
	Deduct stair room	-1.000	8.000	3.600	0.120		-3.456
	porch	1.000	5.400	4.200	0.120		2.722
	FF	1.000	13.600	4.400	0.120		7.181
	Total						**42.351**
	Sunshade						
	GF -Long wall	2.000	22.600	0.600	(0.1+0.07)/2		2.305
	Short	2.000	13.400	0.600	(0.1+0.07)/2		1.367
	FF	1.000	22.400	0.600	(0.1+0.07)/2		1.142
		2.000	3.000	0.600	(0.1+0.07)/2		0.306
	Total						**5.120**
	Sunshade						
	waist slab	1.000	3.400	1.500	0.120		0.612
	waist slab	1.000	3.900	1.500	0.120		0.702
	waist slab	1.000	1.000	1.500	0.120		0.180
	step	22.000	0.300	1.500	.15/2		0.743
	landing	2.000	1.500	1.500	0.120		0.540
	Total						**2.777**
						Total Quantity in cum	**90.338**
1.010	5.34.1						
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						

EST No. :HED/CEHED/EST/105/2022_5_13_12 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Columns						
	GF	24.000	0.300	0.400	3.300		9.504
	Porch	2.000	0.300	0.400	3.300		0.792
	FF	8.000	0.300	0.400	3.000		2.880
	FF	16.000	0.300	0.400	0.800		1.536
	Total						**14.712**
	RCC- upto plinth level						
	Footing	26.000	2.000	2.000	0.200		20.800
		26.000	1/3	(2*2)+(0.5*0.5)+(2*0.5)	0.200		9.100
	Footing pedestal	26.000	0.500	0.500	1.000		6.500
	Stair bottom slab	1.000	1.500	1.000	0.120		0.180
	Plinth beam-Long wall	3.000	21.500	0.450	0.450		13.061
	Short wall	3.000	13.000	0.450	0.450		7.898
	Cross wall-rooms	3.000	4.000	0.450	0.450		2.430
	Toilet	3.000	1.500	0.450	0.450		0.911
	Ramp	1.000	6.000	1.500	(0.60+0.15)/2		3.375
	Soak pit	1.000	4*1.25	0.200	1.000		1.000
	Septic Tank -bed slab	1.000	6.000	2.500	0.150		2.250
	Septic Tank -side wall	2.000	2.100	0.200	1.100		0.924
	Septic Tank -side wall	2.000	0.600	0.200	1.100		0.264
	Septic Tank - baffle wall	2.000	2.100	0.150	0.800		0.504
	Septic Tank - cover slab	1.000	6.000	2.500	0.150		2.250
	Soak pit -cover slab	1.000	1.250	1.250	0.100		0.156
	Total						**71.603**
	Lintel						
	GF-Long wall	3.000	21.500	0.200	0.150		1.935
	Short wall	3.000	13.000	0.200	0.150		1.170
	Cross wall-rooms	3.000	4.000	0.200	0.150		0.360
	Toilet	3.000	2.700	0.200	0.150		0.243
		1.000	5.000	0.300	0.150		0.225
	FF- Long wall	2.000	13.000	0.200	0.150		0.780

EST No. :HED/CEHED/EST/105/2022_5_13_12 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Short wall	2.000	3.600	0.200	0.150		0.216
	Total						**4.929**
	Beam						
	longitudinal	6+2	3.850	0.300	0.350		3.234
		6+2	3.600	0.300	0.350		3.024
		7+2	4.750	0.300	0.350		4.489
	transverse	4+4	3.500	0.300	0.350		2.940
		8.000	5.800	0.300	0.350		4.872
		4.000	2.300	0.300	0.350		0.966
	porch	2.000	4.400	0.300	0.350		0.924
	Total						**20.449**
	Roof slab						
	GF	1.000	22.000	13.600	0.120		35.904
	Deduct stair room	-1.000	8.000	3.600	0.120		-3.456
	porch	1.000	5.400	4.200	0.120		2.722
	FF	1.000	13.600	4.400	0.120		7.181
	Total						**42.351**
	Sunshade						
	GF -Long wall	2.000	22.600	0.600	(0.1+0.07)/2		2.305
	Short	2.000	13.400	0.600	(0.1+0.07)/2		1.367
	FF	1.000	22.400	0.600	(0.1+0.07)/2		1.142
		2.000	3.000	0.600	(0.1+0.07)/2		0.306
	Total						**5.120**
	Sunshade						
	waist slab	1.000	3.400	1.500	0.120		0.612
	waist slab	1.000	3.900	1.500	0.120		0.702
	waist slab	1.000	1.000	1.500	0.120		0.180
	step	22.000	0.300	1.500	.15/2		0.743
	landing	2.000	1.500	1.500	0.120		0.540
	Total						**2.777**
						Total Quantity in cum	**161.941**
1.011	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	Footing & foundations						

EST No. :HED/CEHED/EST/105/2022_5_13_12 (Edit Id : 6)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Footing PCC	4*26	2.200		0.150		34.320
	Footing RCC	4*26	2.000		.2+.2		83.200
	Pedestal	4*26	0.500		1.000		52.000
	PCC- Long wall	3.000	21.500		0.150		9.675
	Short wall	3.000	13.000		0.150		5.850
	Cross wall-rooms	3.000	4.000		0.150		1.800
	Toilet	3.000	1.500		0.150		0.675
	Step	1.000	5.000		0.150		0.750
	Septic Tank-bed slab	1.000	6+2.5		0.150		1.275
	Soak pit-bed slab	1.000	1.250+1.250		0.150		0.375
	Septic Tank -side wall	2*2	2.1+6		1.100		35.640
	Septic Tank - baffle wall	2*2	2.100		0.800		6.720
	Septic Tank - cover slab	2.000	6+2.5		0.150		2.550
	Soak pit -cover slab	4.000	1.250		0.100		0.500
	Total						**235.330**
						Total Quantity in sqm	**235.330**
1.012	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Slabs						
	Waist slab	2.000	3.400		0.120		0.816
		1.000	3.400	1.500			5.100
		2.000	1.000		0.120		0.240
		1.000	1.000	1.500			1.500
		2.000	3.900		0.120		0.936
		1.000	3.900	1.500			5.850
	Step	22.000	0.300		.15/2		0.495
	Landing	2.000	1.500	1.500			4.500
	Roof slab-GF	1.000	22.000	13.600			299.200
	Roof slab-GF	2.000	22+13.6		0.120		8.544
	Deduct stair room	-1.000	8.000	3.600			-28.800
	porch roof slab	1.000	5.400	4.200			22.680
	porch roof slab	2.000	5.400+4.2		0.120		2.304

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Roof slab- FF	1.000	13.600	4.400			59.840
	Roof slab- FF	2.000	13.6+4.4		0.120		4.320
	Total						**387.525**
	Sunshade						
	GF -Long wall	2.000	22.600	0.600			27.120
		1.000	22.600		(0.1+0.07)/2		1.921
	Short	2.000	13.400	0.600			16.080
		1.000	13.400		(0.1+0.07)/2		1.139
	FF	2.000	22.400	0.600			26.880
		1.000	22.400		(0.1+0.07)/2		1.904
		2.000	3.000	0.600			3.600
		1.000	3.000		(0.1+0.07)/2		0.255
	Total						**78.899**
						Total Quantity in sqm	**466.424**
1.013	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	Plinth beam						
	Plinth beam-Long wall	2*3.000	21.500		0.450		58.050
	Short wall	2*3.000	13.000		0.450		35.100
	Cross wall-rooms	2*3.000	4.000	0.450	0.450		4.860
	Toilet	2*3.000	1.500	0.450	0.450		1.823
	Total						**99.833**
	Lintel						
	GF-Long wall	2*3.000	21.500		0.150		19.350
	Short wall	2*3.000	13.000		0.150		11.700
	Cross wall-rooms	2*3.000	4.000		0.150		3.600
	Toilet	2*3.000	2.700		0.150		2.430
		2*1.000	5.000		0.150		1.500

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	FF- Long wall	2*2.000	13.000		0.150		7.800
	Short wall	2*2.000	3.600		0.150		2.160
	Total						**48.540**
	Beams						
	longitudinal	2*8	3.850		0.350		21.560
		8.000	3.850	0.300			9.240
		2*8	3.600		0.350		20.160
		8.000	3.600	0.300			8.640
		2*9	4.750		0.350		29.925
		9.000	4.750	0.300			12.825
	transverse	2*8	3.500		0.350		19.600
		7.000	3.500	0.300			7.350
		2*8.000	5.800		0.350		32.480
		8.000	5.800	0.300			13.920
		2*4.000	2.300		0.350		6.440
		4.000	2.300	0.300			2.760
	porch	2*2.000	4.400		0.350		6.160
		2.000	4.400	0.300			2.640
	Total						**193.700**
						Total Quantity in sqm	**342.073**
1.014	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	Columns						
	GF	24.000	(0.300+0.4)*2		3.300		110.880
	porch column	2.000	(0.300+0.4)*2		3.300		9.240
	FF	8.000	(0.300+0.4)*2		3.000		33.600
		16.000	(0.300+0.4)*2		0.800		17.920
	Total						**171.640**
						Total Quantity in sqm	**171.640**
1.015	5.9.7						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Centering and shuttering including strutting, etc. and removal of form for:Stairs, (excluding landings) except spiral - staircases)						
	Stair steps						
	Step	22.000	1.500		0.150		4.950
	Step	22.000	0.300		.15/2		0.495
	Total						**5.445**
						Total Quantity in sqm	**5.445**
1.016	OD5511/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth level-Thermo - HCR						
	Steel						
	LS Qty-80kg/m3 For item no.5	72.000				80.000 000	5760.000
	For item no.9	14.712				80.000 000	1176.960
	For item no.10	75.626				80.000 000	6050.080
	Total						**12987.040**
						Total Quantity in kilogram	**12987.040**
1.017	50.6.7.2						
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.						
	Laterite masonry						
	GF-Long wall	3.000	21.500	0.200	3.300		42.570
	Short wall	3.000	13.000	0.200	3.300		25.740
	Cross wall-rooms	3.000	4.000	0.200	3.300		7.920
	Toilet	3.000	2.700	0.200	3.300		5.346
	Step	1.000	5.000	0.600	0.300		0.900
		1.000	5.000	0.300	0.300		0.450
	FF- Long wall	2.000	13.000	0.200	3.000		15.600
	Parapet wall	1.000	17.26+13.4+17.26	0.150	0.800		5.750
	Toilet	3.000	2.700	0.200	3.300		5.346
	Rolling shutter	-1.000	4.600	0.200	3.000		-2.760
	Door-D	-2.000	1.200	0.200	2.100		-1.008
	D1	-5.000	1.000	0.200	2.100		-2.100
	Window	-12.000	1.500	0.200	1.500		-5.400

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	V1	-3.000	0.600	0.200	0.600		-0.216
	Glass panes	-2.000	3.700	0.200	1.500		-2.220
	Glass panes	-2.000	1.160	0.200	1.500		-0.696
	Glass panes	-2.000	3.500	0.200	1.500		-2.100
	Glass panes	-3.000	1.260	0.200	1.500		-1.134
	Glass panes	-1.000	2.100	0.200	1.500		-0.630
	Glass panes	-1.000	4.900	0.200	1.500		-1.470
	Total						**89.888**
						Total Quantity in cum	**89.888**
1.018	21.1.1.1						
	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS : 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminnium snap beading for glazing /paneling, C.P. brass/ stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.(Glazing, paneling and dash fasteners to be paid for separately): For fixed portionAnodised aluminium (anodised transparent or dyed to required shade according to IS : 1868, Minimum anodic coating of grade AC 15)						
	Aluminium door						
	Frame- Door D	2.000	5.400			2.000000	21.600
	Door D1	5.000	5.200			2.000000	52.000
	Shutter - Door D	2.000	8.400			1.000000	16.800
	Door D1	5.000	7.600			1.000000	38.000
	Window frame	12.000	4*(1.5+.8)			2.000000	220.800
	V1	3.000	4*0.600			2.000000	14.400
	Frames-Glass panes	2.000	2*(3.7+1.5)			2.000000	41.600
	Glass panes	2.000	2*(1.16+1.5)			2.000000	21.280
	Glass panes	2.000	2*(3.5+1.5)			2.000000	40.000
	Glass panes	3.000	2*(1.26+1.5)			2.000000	33.120

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Glass panes	1.000	2*(2.1+1.5)			2.000000	14.400
	Glass panes	1.000	2*(4.9+1.5)			2.000000	25.600
	Total						**539.600**
						Total Quantity in kg	**539.600**
1.019	21.2.2						
	Providing and fixing 12 mm thick prelaminated particle board flat pressed three layer or graded wood particle board conforming to IS : 12823 Grade I Type II, in panelling fixed in aluminum doors, windows shutters and partition frames with C.P. brass / stainless steel screws etc. complete as per architectural drawings and directions of Engineer - in- Charge.Pre- laminated particle board with decorative lamination on both sides						
	Panelling-Prelaminated particle board						
	Door D	2.000	1.000		0.900		1.800
	Door D1	5.000	0.800		0.900		3.600
	Total						**5.400**
						Total Quantity in sqm	**5.400**
1.020	21.3.2						
	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of Engineer - in -Charge. (Cost of aluminium snap beading shall be paid in basic item):With float glass panes of 5.50 mm thickness						
	Glazing						
	Door-D	2.000	0.900		0.800		1.440
	D1	5.000	0.700		0.800		2.800
	Window	2*12.000	1.300		0.600		18.720
	V1	3.000	0.400		0.400		0.480
	Glass panes	2.000	3.600		1.400		10.080
	Glass panes	2.000	1.060		1.400		2.968
	Glass panes	2.000	3.400		1.400		9.520
	Glass panes	3.000	1.160		1.400		4.872
	Glass panes	1.000	2.000		1.400		2.800
	Glass panes	1.000	4.800		1.400		6.720
	Total						**60.400**
						Total Quantity in sqm	**60.400**
1.021	9.116						

EST No. :HED/CEHED/EST/105/2022_5_13_12 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing sliding arrangement in racks/ cupboards/cabinets shutter by with stainless steel rollers to run inside C or E aluminium channel section (The payment of C or E channel shall be made separately						
	Sliding arrangement						
	Windows	4*12					48.000
	Total						**48.000**
						Total Quantity in no	**48.000**
1.022	9.117.1						
	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1 mm), with wall thickness 2.0mm (±0.2 mm), corners of the door frame to be jointed with galvanized brackets and stainless steel screws, joints mitred and plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 x 19 mm and 1 mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-chargeExtruded section profile size 48x40 mm						
	frame						
	D2	2*3	2.100				12.600
	D2	3.000	0.800				2.400
	Total						**15.000**
						Total Quantity in metre	**15.000**
1.023	9.118.1						
	Providing and fixing to existing door frames24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness,fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge(For W.C. and bathroom door shutter).						
	Shutter						
	D2	3.000	0.800		2.000		4.800
	Total						**4.800**
						Total Quantity in sqm	**4.800**
1.024	9.53						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete block 30x10x15 cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	Hold fast						
	Door	7*6				1.000000	42.000
	Window	12*4				1.000000	48.000
	V	3*2				1.000000	6.000
	Total						**96.000**
						Total Quantity in each	**96.000**
1.025	9.97.5						
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:100x10 mm						
	Tower bolt						
	Doors	12.000					12.000
	Total						**12.000**
						Total Quantity in no	**12.000**
1.026	9.88						
	Providing and fixing chromium plated brass 100 mm mortice latch and lock with 6 levers and a pair of lever handles of approved quality with necessary screws etc. complete.						
	Mortice latch						
	Doors	7.000					7.000
	Total						**7.000**
						Total Quantity in no	**7.000**
1.027	50.9.15.1						
	Supplying and fixing 200 mm Aluminium aldrop						
	Aluminium aldrop						
	For door D2	3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.028	10.6.1						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.25 mm M.S. laths with 1.25 mm thick top cover						
	Rolling shutter						
	RS at entrance	1.000	4.600		3.000		13.800
	RS -FF	1.000	3.550		2.700		9.585
	Total						**23.385**
						Total Quantity in sqm	**23.385**
1.029	50.18.9.22.8						
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement -110 mm dia Vent cowl						
	Vent cowl						
	For toilet	3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.030	50.18.7.4.2						
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall						
	PVC Pipe						
	32mm	60.000					60.000
	Total						**60.000**
						Total Quantity in metre	**60.000**
1.031	50.18.7.6.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 10 Kfg/cm - Internal work- Exposed on wall						
	PVC Pipe						
	50mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.032	50.18.9.4.2						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing PVC pipes includings joints of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 32 mm dia 6 Kgf/cm2						
	PVC Pipe						
	32mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.033	50.18.9.9.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2						
	PVC Pipe						
	110mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.034	50.18.9.13.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 25 mm dia 10 Kgf/cm2- External work - Exposed on wall						
	PVC Pipe						
	25mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.035	50.18.9.14.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - External work - Exposed on wall						
	PVC Pipe						
	32mm	50.000					50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
1.036	50.18.9.18.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall						
	PVC Pipe						
	75mm	50.000					50.000
	Total						**50.000**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in metre	**50.000**
1.037	50.18.9.19.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/ clips/ at 1.00 m spacing . This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 mm dia 6 Kgf/cm2 - External work- Exposed on wall						
	PVC Pipe						
	110mm	40.000					40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.038	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	Plastering-outside						
	GF	2.000	21.5+13.41		3.300		230.406
	FF	2.000	13.41+4		3.000		104.460
	Parapet wall	1.000	(17.26*2) +13.41		0.800+.8 +.10		81.481
	Car porch column	2*2.000	.3+.4		3.300		9.240
	FF- Columns	6.000	(0.3+0.4) *2		0.800		6.720
		6.000	0.300	0.400			0.720
	Sunshade-GF - Long wall	2*2.000	22.600	0.600			54.240
	Short	2*2.000	13.400	0.600			32.160
	FF	2*1.000	22.400	0.600			26.880
		2*2.000	3.000	0.600			7.200
	Total						**553.507**
	Inside						
	Entrance & Stair room	2.000	13+3.6		3.300		109.560
	office room	2.000	4+6		3.300		66.000
	store room	2.000	4+4		3.300		52.800
	rest room	2.000	4+4		3.300		52.800
	toilet	2*3	1.5+1.2		3.300		53.460
	wash area	2.000	2.2+2.6		3.300		31.680
	cabin side	2.000	8.8+17.2		3.300		171.600

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	FF	2.000	13+3.6		3.000		99.600
	Column sides	3.000	(0.3+0.4) *2		3.300		13.860
	Total						**651.360**
	Deductions						
	Rolling shutter	-2*1.000	4.600		3.000	1.000000	-27.600
	Door-D	-2.000	1.200		2.100	1.000000	-5.040
	D1	-5.000	1.000		2.100	1.000000	-10.500
	Window	-12.000	1.500		1.500	1.000000	-27.000
	V1	-3.000	0.600		0.600	1.000000	-1.080
	Glass panes	-2*2.000	3.700		1.500	1.000000	-22.200
	Glass panes	-2.000	1.160		1.500	1.000000	-3.480
	Glass panes	-2*2.000	3.500		1.500	1.000000	-21.000
	Glass panes	-3.000	1.260		1.500	1.000000	-5.670
	Glass panes	-1.000	2.100		1.500	1.000000	-3.150
	Glass panes	-2*1.000	4.900		1.500	1.000000	-14.700
	Total						**-141.420**
						Total Quantity in sqm	**1063.447**
1.039	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	Ceiling plastering						
	Entrance and stair room	1.000	13.000	3.600			46.800
	office room	1.000	4.000	6.000			24.000
	store room	1.000	4.000	4.000			16.000
	rest room	1.000	4.000	4.000			16.000
	toilet	2.000	1.500	1.200			3.600
	wash area	1.000	2.200	2.600			5.720

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	cabin side	1.000	8.800	17.200			151.360
	FF	2.000	13.000	3.600			93.600
	Beams-longitudinal	6+2	3.850		.35+.3+.35		30.800
		6+2	3.600		.35+.3+.35		28.800
		7+2	4.750		.35+.3+.35		42.750
	transverse	4+4	3.500		.35+.3+.35		28.000
		8.000	5.800		.35+.3+.35		46.400
		4.000	2.300		.35+.3+.35		9.200
	porch	2.000	4.400		.35+.3+.35		8.800
	Total						**551.830**
						Total Quantity in sqm	**551.830**
1.040	11.36						
	Providing and fixing I st quality ceramic glazed wall tiles conforming to IS : 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer -in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3 kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.						
	Wall tiles						
	Toilet	2*3.000	1.5+1.2		1.500		24.300
	Wash area	1.000	2.000		0.700		1.400
	Total						**25.700**
						Total Quantity in sqm	**25.700**
1.041	11.41.2						
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.						
	Floor Tile						
	Entrance and stair room	1.000	13.000	3.600			46.800
	office room	1.000	4.000	6.000			24.000
	store room	1.000	4.000	4.000			16.000
	rest room	1.000	4.000	4.000			16.000

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	toilet	2.000	1.500	1.200			3.600
	wash area	1.000	2.200	2.600			5.720
	cabin side	1.000	8.800	17.200			151.360
	FF	1.000	13.000	3.600			46.800
	For Skirting - 15% of floor area	46.8+24+16+16+3.6+5.72+151.36+46.8				0.150000	46.542
	Step	2.000	5.000	0.300			3.000
		2.000	5.000		0.150		1.500
	Total						**361.322**
						Total Quantity in sqm	**361.322**
1.042	13.47.1						
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)						
	Exterior Paint						
	GF	2.000	21.5+13.41		3.300		230.406
	FF	2.000	13.41+4		3.000		104.460
	Parapet wall	1.000	(17.26*2)+13.41		0.800+.8+.10		81.481
	Car porch column	2*2.000	.3+.4		3.300		9.240
	FF- Columns	6.000	(0.3+0.4)*2		0.800		6.720
		6.000	0.300	0.400			0.720
	Sunshade-GF - Long wall	2*2.000	22.600	0.600			54.240
	Short	2*2.000	13.400	0.600			32.160
	FF	2*1.000	22.400	0.600			26.880
		2*2.000	3.000	0.600			7.200
	Total						**553.507**
						Total Quantity in sqm	**553.507**
1.043	13.48.1						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Finishing with Deluxe Multi surface paint system for interiors and exteriors using primer as per manufacturers specifications:Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of special primer applied @ 0.75 ltr /10 sqm						
	Interior Paint						
	Entrance & Stair room	2.000	13+3.6		3.300		109.560
	office room	2.000	4+6		3.300		66.000
	store room	2.000	4+4		3.300		52.800
	rest room	2.000	4+4		3.300		52.800
	toilet	2*3	1.5+1.2		3.300		53.460
	wash area	2.000	2.2+2.6		3.300		31.680
	cabin side	2.000	8.8+17.2		3.300		171.600
	FF	2.000	13+3.6		3.000		99.600
	Column sides	3.000	(0.3+0.4) *2		3.300		13.860
	Deductions-Rolling shutter	-2*1.000	4.600		3.000		-27.600
	Door-D	-2.000	1.200		2.100		-5.040
	D1	-5.000	1.000		2.100		-10.500
	Window	-12.000	1.500		1.500		-27.000
	V1	-3.000	0.600		0.600		-1.080
	Glass panes	-2*2.000	3.700		1.500		-22.200
	Glass panes	-2.000	1.160		1.500		-3.480
	Glass panes	-2*2.000	3.500		1.500		-21.000
	Glass panes	-3.000	1.260		1.500		-5.670
	Glass panes	-1.000	2.100		1.500		-3.150
	Glass panes	-2*1.000	4.900		1.500		-14.700
	Toilet- wall tile	-2*3	1.5+1.2		1.500		-24.300
	wash area- wall tile	-1.000	2.000		0.700		-1.400
	Ceiling- Entrance and stair room	1.000	13.000	3.600			46.800
	office room	1.000	4.000	6.000			24.000
	store room	1.000	4.000	4.000			16.000

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rest room	1.000	4.000	4.000			16.000
	toilet	2.000	1.500	1.200			3.600
	wash area	1.000	2.200	2.600			5.720
	cabin side	1.000	8.800	17.200			151.360
	FF	2.000	13.000	3.600			93.600
	Beams-longitudinal	6+2	3.850		.35+.3+.35		30.800
		6+2	3.600		.35+.3+.35		28.800
		7+2	4.750		.35+.3+.35		42.750
	transverse	4+4	3.500		.35+.3+.35		28.000
		8.000	5.800		.35+.3+.35		46.400
		4.000	2.300		.35+.3+.35		9.200
	porch	2.000	4.400		.35+.3+.35		8.800
	Total						**1036.070**
						Total Quantity in sqm	**1036.070**
1.044	13.52.1						
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work						
	Epoxy paint						
	RS at entrance	2.000	4.600		3.000	1.100000	30.360
	RS -FF	2.000	3.550		2.700	1.100000	21.087
	Total						**51.447**
						Total Quantity in sqm	**51.447**
1.045	10.28						
	Providing and fixing stainless steel (Grade 304) railing made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners, stainless steel bolts etc., of required size on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.)						
	Hand Rail						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	50mm Pipe	1.000	10.000			2.400000	24.000
	40mm Pipe	10.000	0.800			1.910000	15.280
		2.000	10.000			1.910000	38.200
	Total						**77.480**
						Total Quantity in kg	**77.480**
1.046	17.3.1						
	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :W.C. pan with ISI marked white solid plastic seat and lid						
	WC						
	Water Closet	3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.047	50.17.1.4						
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.						
	Health Faucet						
		3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.048	17.7.3						
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 550x400 mm with a pair of 15 mm C.P. brass pillar taps						
	Wash basin						
	Wash basin	3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.049	18.51.1						
	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.15 mm nominal bore						
	Bib cock						
	Bib cock	6.000					6.000

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**6.000**
						Total Quantity in each	**6.000**
1.050	18.52.1						
	Providing and fixing C.P brass stop cock (concealed) of standard design and of approved make conforming to IS: 893115 mm nominal bore						
	Stop cock						
	For Health faucet and water closet	3*2					6.000
	For wash basin	3.000					3.000
	Total						**9.000**
						Total Quantity in each	**9.000**
1.051	17.73.1						
	Providing and fixing PTMT towel rail complete with brackets fixed to wooden cleats with CP brass screws with concealed fitting arrangement of approved quality and colour450 mm long towel rail with total length of 495 mm, 78 mm wide and effective height of 88 mm. weighing not less than 170 gms						
	Towel rail						
	For wash room	2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.052	21.12.2						
	Providing and fixing aluminium tubular handle bar 32 mm outer dia, 3.0mm thick & 2100 mm long with S.S. screws etc. complete as per direction of Engineer -in-Charge.Powder coated minimum thickness 50 micron aluminium tubular handle bar						
	Aluminium handle bar						
	For doors	7*2					14.000
	Total						**14.000**
						Total Quantity in no	**14.000**
1.053	17.74						
	Providing and fixing PTMT shelf 440 mm long, 124 mm width and 36 mm height of approved quality and colour, weighing not less than 300 gms.						
	PTMT Shelf						
	For Toilet	3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.054	18.65						
	Providing and fixing PTMT Soap Dish Holder having length of 138 mm, breadth 102 mm, height of 75 mm with concealed fittings arrangements, weighing not less than 106 gms.						
	Soap dish						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		4.000					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**
1.055	17.71						
	Providing and fixing PTMT liquid soap container 109 mm wide, 125 mm high and 112 mm distance from wall of standard shape with bracket of the same materials with snap fittings of approved quality and colour, weighing not less than 105 gms						
	Fixing liquid soap container						
	liquid soap container	2.000					2.000
	Total						**2.000**
						Total Quantity in each	**2.000**
1.056	17.10.1.2						
	Providing and fixing Stainless Steel A ISI 304 (18/8) kitchen sink as per IS 13983 with C.I. brackets and stainless steel plug 40 mm, including painting of fittings and brackets, cutting and making good the walls wherever required: Kitchen sink with drain board510x 1040 mm bowl depth 225 mm						
	Kitchen sink						
	In rest room	1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
1.057	17.31						
	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.						
	Fixing mirror						
	mirror	2.000					2.000
	Total						**2.000**
						Total Quantity in each	**2.000**
1.058	18.48						
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.						
	Water tank						
	Water tank	1.000	1000.000				1000.000
	Total						**1000.000**
						Total Quantity in Litre	**1000.000**
1.059	8.2.2.2						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing 18 mm thick gang saw cut, mirror, polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations, of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.Area of slab over 0.50 sqm						
	Inauguration stones						
	Inauguration stone	1.000	1.000	0.700			0.700
	Total						**0.700**
						Total Quantity in sqm	**0.700**
1.060	16.21						
	Engraving letters in hard stone						
	Engraving on the inauguration stone						
	For inauguration stone	200.000			2.000		400.000
	Total						**400.000**
						Total Quantity in per Letter per cm height	**400.000**
1.061	13.71						
	Lettering with black Japan pint of approved brand and manufacture						
	For lettering on Office Name Board						
	say 200Letters	200.000			3.000		600.000
	Total						**600.000**
						Total Quantity in per Letter per cm height	**600.000**

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ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Water Supply Arrangements in the Harbour-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Construction of OH RCC Water Tank and Pump House**			
1.001	2.31			
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared			
	Net Total	400.000sqm	@14.48/sqm	5792.00
1.002	OD1292/2022-2023			
	Chipping and removing top of RCC piles to lines and levels carefully without damaging remaining portion of pile and removing debris upto a distance of 150 m including all labour charges , hire of equipments etc.complete as per directions of departmental officers at site Unit- cum Taking output - 1.25 cum			
	Net Total	2.543cum	@3537.94/cum	8996.98
1.003	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	65.340cum	@210.02/cum	13722.71
1.004	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	6.534cum	@6687.21/cum	43694.23
1.005	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	33.074cum	@9237.20/cum	305511.15
1.006	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content			

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Sl No	Specification	Quantity	Rate	Amount
	as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	88.000cum	@10858.36/cum	955535.68
1.007	5.34.1			
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	121.074cum	@80.55/cum	9752.51
1.008	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	38.280sqm	@329.03/sqm	12595.27
1.009	OD5503/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - HCR Fe-500D or more			
	Net Total	13858.800kg	@96.62/kg	1339037.26
1.010	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	179.280sqm	@847.44/sqm	151929.04
1.011	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	200.160sqm	@800.47/sqm	160222.08
1.012	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	133.770sqm	@637.63/sqm	85295.77
1.013	50.6.7.2			
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.			
	Net Total	12.900cum	@7872.96/cum	101561.18
1.014	9.143			
	Providing and fixing factory made uPVC door frame, made of uPVC extruded			

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Sl No	Specification	Quantity	Rate	Amount
	section, of size 65 mm x 55 mm with wall thickness 2.0 mm (? 0.2mm), corners of the door frame to be mitred cut and jointed with plastic brackets and stainless steel screws, reinforcing hinge side vertical of the frames with PVC profile of Size 28 mm x 30 mm having wall thickness 2 mm (? 0.2 mm), including providing & fixing 3 nos of 125 mm long stainless steel hinges to the frame, fixing the frame with jamb with required number & size of anchor dash fastners, all complete as per manufacturer's specification and direction of Engineer-in-charge.			
	Net Total	6.500metre	@610.23/metre	3966.50
1.015	9.142.2			
	35 mm thick factory made Solid panel PVC Door shutter, made out of single piece extruded solid PVC (±0.2 mm) thick, having styles & rails (except lock rail) of size 95 mmx 35 mm x 5 mm, out of which 75 mm shall be flat and 20 mm shall be tapered (on both side), having one side thickness of 15 mm integrally extruded on the hinges side of the profile for better screw holding power, including reinforcing with MS tube of size 40 mm x 20 mm x 1 mm, joints of styles & rails to be mitered cut & joint with the help of PVC solvent cement, self driven self tapping screws & M.S. rectangular pipes bracket of size 190 mm x 100 mm of cross section size 35 mm x 17 mm s 1 mm at each corner. Single piece extruded 5 mm thick solid PVC Lock rail of size 115 mm x 35 mm x 35 mm, out of which 95 mm to be flat and 20 mm to be tapered at both ends, having 15 mm solid core in middle of rail section integrally extruded, fixing the styles & rails with the help of solvent and self driven self tapping screws of 125 mm x 11 mm, including providing 5 mm Single piece solid PVC extruded sheet inserted in the door as panel, all complete as per manufacturer's specification and direction of Engineer-in-charge.Decorative finish (wood grained finish)			
	Net Total	2.100sqm	@4438.67/sqm	9321.21
1.016	9.147.5			
	Providing and fixing factory made uPVC white colour casement/casement cum fixed glazed windows comprising of uPVC multi-chambered frame, sash and mullion (where ever required) extruded profiles duly reinforced with 1.60 +/- 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), uPVC extruded glazing beads of appropriate dimension, EPDM gasket, stainless steel (SS 304 grade) friction hinges, zinc alloy (white powder coated) casement handles, G.I fasteners 100 x 8 mm size for fixing frame to finished wall, plastic packers, plastic caps and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, mullion (if required) shall be also fusion welded including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, all complete as per approved drawing & direction of Engineer-in-Charge. (Single / double glass panes and silicon sealant shall be paid separately) Note: For uPVC frame, sash and mullion extruded profiles minus 5% tolerance in dimension i.e. in depth & width of profile shall be acceptable.Casement window double panels with S.S. friction hinges (350 x 19 x 1.9 mm) made of (big series)frame 67 x 60 mm & sash / mullion 67 x 80 mm both having wall thickness of 2.3 ± 0.2 mm and single glazing bead/ double glazing bead of appropriate dimension. (Area of window above 1.50 sqm).			
	Net Total	3.000sqm	@11164.86/sqm	33494.58

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Sl No	Specification	Quantity	Rate	Amount
1.017	9.7.7.1			
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick: Float glass panes4 mm thick glass pane			
	Net Total	2.240sqm	@2070.48/sqm	4637.88
1.018	9.100.2			
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm			
	Net Total	2.000no	@61.02/no	122.04
1.019	9.97.3			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm			
	Net Total	4.000no	@103.95/no	415.80
1.020	50.9.15.2			
	Supplying and fixing 300 mm Aluminium aldrop			
	Net Total	1.000no	@188.93/no	188.93
1.021	13.7.2			
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	577.730sqm	@379.14/sqm	219040.55
1.022	13.15			
	20 mm cement plaster 1:2 (1 cement : 2 stone dust)			
	Net Total	3.000sqm	@476.55/sqm	1429.65
1.023	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	151.640sqm	@262.57/sqm	39816.11
1.024	10.25.2			
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works			
	Net Total	4000.000kg	@151.29/kg	605160.00
1.025	13.43.1			
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer			

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Sl No	Specification	Quantity	Rate	Amount
	Net Total	729.370sqm	@69.33/sqm	50567.22
1.026	13.60.1			
	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade:Two or more coats on new work			
	Net Total	729.370sqm	@148.59/sqm	108377.09
1.027	50.18.9.9.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2			
	Net Total	150.000metre	@521.14/metre	78171.00
1.028	50.18.8.8.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 75 mm pipe 6 Kgf/cm2			
	Net Total	20.000metre	@614.17/metre	12283.40
1.029	18.17.5			
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :65 mm nominal bore			
	Net Total	5.000each	@1718.82/each	8594.10
1.030	50.18.9.8.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2			
	Net Total	1000.000metre	@356.56/metre	356560.00
1.031	50.18.7.4.2			
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall			
	Net Total	750.000metre	@295.71/metre	221782.50
1.032	18.17.2			
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :32 mm nominal bore			
	Net Total	10.000each	@671.37/each	6713.70
1.033	18.32.1			
	Constructing masonry chamber 30x30x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for stop cock, with C.I. surface box 100x100x75 mm (inside) with hinged cover fixed in cement concrete slab 1:2:4 mix (1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm			

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Sl No	Specification	Quantity	Rate	Amount
	nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S (non modular) bricks of class designation 7.5			
	Net Total	3.000each	@1827.73/each	5483.19
1.034	50.18.9.21.4			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend			
	Net Total	10.000no	@87.89/no	878.90
1.035	50.18.9.21.9			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling			
	Net Total	5.000no	@72.21/no	361.05
1.036	18.59.2			
	Providing and fixing C.I double acting air valve of approved quality with bolts, nuts, rubber insertion etc. complete (The tail pieces, tapers etc. if required will be paid separately):80 mm dia			
	Net Total	3.000no	@7208.30/no	21624.90
1.037	50.18.9.6.2			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2			
	Net Total	100.000metre	@240.68/metre	24068.00
1.038	50.18.9.21			
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Elbow			
	Net Total	10.000no	@94.28/no	942.80
1.039	50.18.9.21.5			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee			
	Net Total	10.000no	@94.65/no	946.50
1.040	18.15.2			
	Providing and fixing brass bib cock of approved quality :20 mm nominal bore			
	Net Total	20.000each	@377.04/each	7540.80
1.041	18.60.1			
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore			
	Net Total	1.000each	@4130.60/each	4130.60
			Heading Total(Rs)	5020264.86

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Sl No	Specification	Quantity	Rate	Amount
2	**Pile liners and miscellaneous items for piling**			
2.001	12.22			
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.			
	Net Total	4.033MT	@125636.20/MT	506690.79
2.002	OD1321/2022-2023			
	Driving down vertically M.s Liner already fabricated to the required depth by power winch and accessories including all hire charge of machinery , labour charges etc complete			
	Net Total	45.000metre	@568.30/metre	25573.50
2.003	OD1325/2022-2023			
	Supply, Fitting and Placing in position reinforcement in cages using HCR bar Reinforcement including cost of materials, labour charges, conveyance and placing the cages in bore holes providing precast cover blocks etc, complete as per Drawing and Technical Specificationsand as directed by Engineer in charge excluding cost of welding charges. Unit = 1 MT Taking output = 1 MT a) Material			
	Net Total	38.565tonne	@98321.63/tonne	3791773.66
2.004	12.23.3			
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm			
	Net Total	225.000metre	@7210.41/metre	1622342.25
			Heading Total(Rs)	5946380.20
3	**Construction of Sump**			
3.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	65.340cum	@210.02/cum	13722.71
3.002	60.7.4			
	DR PACKING FOR APRONS - Rough stone dry packing for apron with good quality blasted rubble including packing to compactness to lines levels, cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site			
	Net Total	19.602cum	@3557.50/cum	69734.12
3.003	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4			

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Sl No	Specification	Quantity	Rate	Amount
	coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	6.534cum	@6687.21/cum	43694.23
3.004	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	3.960sqm	@329.03/sqm	1302.96
3.005	5.9.2			
	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.			
	Net Total	125.600sqm	@703.77/sqm	88393.51
3.006	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	34.020sqm	@800.47/sqm	27231.99
3.007	5.1.2			
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size			
	Net Total	8.000cum	@8914.94/cum	71319.52
3.008	5.2.2			
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)			
	Net Total	13.000cum	@10748.82/cum	139734.66
3.009	5.3			
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).			
	Net Total	6.000cum	@11277.61/cum	67665.66
3.010	5.22.1			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelMild steel and Medium Tensile steel bars			
	Net Total	640.000kg	@94.84/kg	60697.60
3.011	5.22A.1			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Mild steel and Medium			

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Tensile steel bars			
	Net Total	2160.000kilogram	@94.84/kilogram	204854.40
3.012	50.13.1			
	9 mm cement plastering of mix : 1:3 (1 cement : 3 fine sand) including all cost of materials, labour charges etc complete			
	Net Total	59.200sqm	@285.84/sqm	16921.73
3.013	13.9.1			
	Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster			
	Net Total	66.400sqm	@404.42/sqm	26853.49
3.014	50.18.9.19.2			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 m dia 4 Kgf/cm2 - External work - Exposed on wall			
	Net Total	10.000metre	@329.39/metre	3293.90
3.015	50.18.9.8.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2			
	Net Total	50.000metre	@356.56/metre	17828.00
3.016	50.18.9.18.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall			
	Net Total	50.000metre	@279.39/metre	13969.50
3.017	50.18.7.6.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing . This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 6 Kgf/cm2 - Internal work- Exposed on wall			
	Net Total	20.000metre	@369.84/metre	7396.80
3.018	50.18.9.6.2			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2			
	Net Total	20.000metre	@240.68/metre	4813.60
3.019	50.18.9.21.4			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend			

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EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	Quantity	Rate	Amount
	Net Total	5.000no	@87.89/no	439.45
3.020	50.18.9.21.5			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee			
	Net Total	5.000no	@94.65/no	473.25
3.021	50.18.9.21.8			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75 mm dia End cap			
	Net Total	1.000no	@64.08/no	64.08
3.022	50.18.9.21.9			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling			
	Net Total	2.000no	@72.21/no	144.42
3.023	18.37.1			
	Constructing masonry chamber 60x45x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for water meter complete with C.I double flap surface box 400x200x200 mm (inside) with locking arrangement and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 grades stone aggregate 20 nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S. (non modular) bricks of class designation 7.5			
	Net Total	1.000each	@9587.28/each	9587.28
3.024	18.60.1			
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore			
	Net Total	1.000each	@4130.60/each	4130.60
			Heading Total(Rs)	894267.46
			Total Estimation PAC	11860912.52

Sl No	Description	Percentage/LS	Amount
4	**Lumsum Heading**		
4.001	LS provision for part TS		
	0.00	0.00%	2000000.00
4.002	Water connection charges (KWA)		
	0.00	0.00%	1000000.00
4.003	LS Amount for Electrification		
	0.00	0.00%	1900000.00
		Total Lumsum Amount	4900000.00

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Sl No	Specification	Quantity	Rate	Amount
5	**Extra Charges**			
4.001	Provision for GST			
		11860912.52	18.00%	2134964.25
			Grand Total	18895876.77
			Round off	4123.23
			Rounded Total(Rs)	18900000.00
	Rupees One Crore Eighty Nine Lakh			

ePRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Water Supply Arrangements in the Harbour-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Construction of OH RCC Water Tank and Pump House						
1.001	2.31						
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared						
	site clearance						
		1.000	20.000	20.000			400.000
	Total						**400.000**
						Total Quantity in sqm	**400.000**
1.002	OD1292/2022-2023						
	Chipping and removing top of RCC piles to lines and levels carefully without damaging remaining portion of pile and removing debris upto a distance of 150 m including all labour charges , hire of equipments etc.complete as per directions of departmental officers at site Unit- cum Taking output - 1.25 cum						
	for pile						
		9.000	3.140/4	.6*.6	1.000	1.000000	2.543
	Total						**2.543**
						Total Quantity in cum	**2.543**
1.003	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	for pile cap						
		1.000	6.600	6.600	1.500		65.340
	Total						**65.340**
						Total Quantity in cum	**65.340**
1.004	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	for pile pcc						
		1.000	6.600	6.600	0.150		6.534
	Total						**6.534**

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**6.534**
1.005	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	column upto GL and footing						
	column upto GL	9.000	0.600	0.600	0.700		2.268
	Raft	1.000	6.400	6.400	0.750		30.720
	rounding	1.000	0.086				0.086
	Total						**33.074**
						Total Quantity in cum	**33.074**
1.006	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	columns and walls						
	column from GL to top	9.000	0.400	0.400	12.450		17.928
	Wall of water tank	2.000	6.000	0.250	3.000		9.000
		2.000	5.600	0.250	3.000		8.400
	rounding	1.000	2.672				2.672
	Total						**38.000**
	Beams and slab						
	tie beams	12*3	2.400	0.300	0.300		7.776
	haunch	24*3	0.300	0.300	0.300		1.944
	bottom slab for tank	1.000	7.600	7.600	0.250		14.440
	bottom beam for slab	3.000	6.000	0.300	0.300		1.620
		3.000	5.100	0.300	0.300		1.377

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	top slab cover	1.000	6.000	6.000	0.120		4.320
	slab on GF	1.000	7.600	7.600	0.150		8.664
	slab projections	2*4	7.600	0.800	0.150		7.296
	lintel GF	1.000	6.000	0.200	0.200		0.240
	sunshade GF	1.000	6.000	0.600	0.100		0.360
	rounding	1.000	1.963				1.963
	Total						**50.000**
						Total Quantity in cum	**88.000**
1.007	5.34.1						
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	column upto GL and footing						
	column upto GL	9.000	0.600	0.600	0.700		2.268
	Raft	1.000	6.400	6.400	0.750		30.720
	rounding	1.000	0.086				0.086
	Total						**33.074**
	columns and walls						
	column from GL to top	9.000	0.400	0.400	12.450		17.928
	Wall of water tank	2.000	6.000	0.250	3.000		9.000
		2.000	5.600	0.250	3.000		8.400
	rounding	1.000	2.672				2.672
	Total						**38.000**
	Beams and slab						
	tie beams	12*3	2.400	0.300	0.300		7.776
	haunch	24*3	0.300	0.300	0.300		1.944
	bottom slab for tank	1.000	7.600	7.600	0.250		14.440
	bottom beam for slab	3.000	6.000	0.300	0.300		1.620
		3.000	5.100	0.300	0.300		1.377
	top slab cover	1.000	6.000	6.000	0.120		4.320
	slab on GF	1.000	7.600	7.600	0.150		8.664
	slab projections	2*4	7.600	0.800	0.150		7.296
	lintel GF	1.000	6.000	0.200	0.200		0.240
	sunshade GF	1.000	6.000	0.600	0.100		0.360

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	1.963				1.963
	Total						**50.000**
						Total Quantity in cum	**121.074**
1.008	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	for pile cap						
	for pcc	4.000	6.600		0.150		3.960
	for pile cap	4.000	6.400		0.750		19.200
	column upto GL	9.000	2.400		0.700		15.120
	Total						**38.280**
						Total Quantity in sqm	**38.280**
1.009	OD5503/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - HCR Fe-500D or more						
	Reinforcement						
		1.000	38.000			120.000000	4560.000
		1.000	50.000			120.000000	6000.000
	Total						**10560.000**
	column						
	column upto GL	9.000	0.600	0.600	0.700	100.000000	226.800
	Raft	1.000	6.400	6.400	0.750	100.000000	3072.000
	Total						**3298.800**
						Total Quantity in kg	**13858.800**
1.010	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	column						
		9.000	1.600		12.450		179.280
	Total						**179.280**
						Total Quantity in sqm	**179.280**
1.011	5.9.3						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	slabs						
	bottom slab for tank	1.000	7.600	7.600			57.760
	top slab cover	1.000	6.000	6.000			36.000
	slab on GF	1.000	7.600	7.600			57.760
	slab projections	2*4	7.600	0.800			48.640
	Total						**200.160**
						Total Quantity in sqm	**200.160**
1.012	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	beams						
	tie beams	12*3	2.400	0.900			77.760
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	lintel GF	1.000	6.000	0.400			2.400
	Sunshade GF	1.000	6.000	0.700			4.200
	Total						**133.770**
						Total Quantity in sqm	**133.770**
1.013	50.6.7.2						
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.						
	Pump house at GF						
	long wall	2.000	6.000	0.200	3.000		7.200
	cross wall	2.000	5.600	0.200	3.000		6.720
	Total						**13.920**
	deduction						
	door	-1.000	1.000	0.200	2.100		-0.420
	window	-1.000	2.000	0.200	1.500		-0.600
	Total						**-1.020**
						Total Quantity in cum	**12.900**
1.014	9.143						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing factory made uPVC door frame, made of uPVC extruded section, of size 65 mm x 55 mm with wall thickness 2.0 mm (? 0.2mm), corners of the door frame to be mitred cut and jointed with plastic brackets and stainless steel screws, reinforcing hinge side vertical of the frames with PVC profile of Size 28 mm x 30 mm having wall thickness 2 mm (? 0.2 mm), including providing & fixing 3 nos of 125 mm long stainless steel hinges to the frame, fixing the frame with jamb with required number & size of anchor dash fastners, all complete as per manufacturer's specification and direction of Engineer-in-charge.						
	door						
		1.000	6.500				6.500
	Total						**6.500**
						Total Quantity in metre	**6.500**
1.015	9.142.2						
	35 mm thick factory made Solid panel PVC Door shutter, made out of single piece extruded solid PVC (±0.2 mm) thick, having styles & rails (except lock rail) of size 95 mmx 35 mm x 5 mm, out of which 75 mm shall be flat and 20 mm shall be tapered (on both side), having one side thickness of 15 mm integrally extruded on the hinges side of the profile for better screw holding power, including reinforcing with MS tube of size 40 mm x 20 mm x 1 mm, joints of styles & rails to be mitered cut & joint with the help of PVC solvent cement, self driven self tapping screws & M.S. rectangular pipes bracket of size 190 mm x 100 mm of cross section size 35 mm x 17 mm s 1 mm at each corner. Single piece extruded 5 mm thick solid PVC Lock rail of size 115 mm x 35 mm x 35 mm, out of which 95 mm to be flat and 20 mm to be tapered at both ends, having 15 mm solid core in middle of rail section integrally extruded, fixing the styles & rails with the help of solvent and self driven self tapping screws of 125 mm x 11 mm, including providing 5 mm Single piece solid PVC extruded sheet inserted in the door as panel, all complete as per manufacturer's specification and direction of Engineer-in-charge.Decorative finish (wood grained finish)						
	door						
		1.000	1.000		2.100		2.100
	Total						**2.100**
						Total Quantity in sqm	**2.100**
1.016	9.147.5						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing factory made uPVC white colour casement/casement cum fixed glazed windows comprising of uPVC multi-chambered frame, sash and mullion (where ever required) extruded profiles duly reinforced with 1.60 +/- 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), uPVC extruded glazing beads of appropriate dimension, EPDM gasket, stainless steel (SS 304 grade) friction hinges, zinc alloy (white powder coated) casement handles, G.I fasteners 100 x 8 mm size for fixing frame to finished wall, plastic packers, plastic caps and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, mullion (if required) shall be also fusion welded including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, all complete as per approved drawing & direction of Engineer-in-Charge. (Single / double glass panes and silicon sealant shall be paid separately) Note: For uPVC frame, sash and mullion extruded profiles minus 5% tolerance in dimension i.e. in depth & width of profile shall be acceptable.Casement window double panels with S.S. friction hinges (350 x 19 x 1.9 mm) made of (big series)frame 67 x 60 mm & sash / mullion 67 x 80 mm both having wall thickness of 2.3 ± 0.2 mm and single glazing bead/ double glazing bead of appropriate dimension. (Area of window above 1.50 sqm).						
	window						
		1.000	2.000		1.500		3.000
	Total						**3.000**
						Total Quantity in sqm	**3.000**
1.017	9.7.7.1						
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick: Float glass panes4 mm thick glass pane						
	window						
		4.000	0.400		1.400		2.240
	Total						**2.240**
						Total Quantity in sqm	**2.240**
1.018	9.100.2						
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm						
	door						
		2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.019	9.97.3						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm						
	door						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.020	50.9.15.2						
	Supplying and fixing 300 mm Aluminium aldrop						
	for door						
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.021	13.7.2						
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:4 (1 cement : 4 fine sand)						
	plastering						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	Total						**448.730**
	pump house						
	long wall	2*2	6.000		3.000		72.000
	cross wall	2*2	5.600		3.000		67.200
	door	-1*2	1.000		2.100		-4.200
	window	-1*2	2.000		1.500		-6.000
	Total						**129.000**
						Total Quantity in sqm	**577.730**
1.022	13.15						
	20 mm cement plaster 1:2 (1 cement : 2 stone dust)						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Inside water tank						
	Floor of slab (excluding haunch)	1.000					1.000
	Vertical sides	1.000					1.000
	Haunchings	1.000					1.000
	Total						**3.000**
						Total Quantity in sqm	**3.000**
1.023	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	ceiling						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**151.640**
1.024	10.25.2						
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works						
	For Ladder						
	Ladder for (Stage height 12.45 m)	4.000	1000.000			1.000000	4000.000
	Total						**4000.000**
						Total Quantity in kg	**4000.000**
1.025	13.43.1						
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	painting						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	pump house-long wall	2*2	6.000		3.000		72.000
	do-cross wall	2*2	5.600		3.000		67.200
	do-door	-1*2	1.000		2.100		-4.200
	do-window	-1*2	2.000		1.500		-6.000
	Total						**577.730**
	painting ceilings						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**729.370**
1.026	13.60.1						
	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade:Two or more coats on new work						
	painting						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	pump house-long wall	2*2	6.000		3.000		72.000
	do-cross wall	2*2	5.600		3.000		67.200
	do-door	-1*2	1.000		2.100		-4.200

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	do-window	-1*2	2.000		1.500		-6.000
	Total						**577.730**
	painting ceiling						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**729.370**
1.027	50.18.9.9.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2						
	pipe line						
		150.000					150.000
	Total						**150.000**
						Total Quantity in metre	**150.000**
1.028	50.18.8.8.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 75 mm pipe 6 Kgf/cm2						
	pipe line						
		20.000					20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
1.029	18.17.5						
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :65 mm nominal bore						
	for supply lines						
		5.000					5.000
	Total						**5.000**
						Total Quantity in each	**5.000**
1.030	50.18.9.8.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2						

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	supply line						
		1000.000					1000.000
	Total						**1000.000**
						Total Quantity in metre	**1000.000**
1.031	50.18.7.4.2						
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall						
	pipe line						
		1.000	750.000				750.000
	Total						**750.000**
						Total Quantity in metre	**750.000**
1.032	18.17.2						
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :32 mm nominal bore						
	for supply lines						
		10.000					10.000
	Total						**10.000**
						Total Quantity in each	**10.000**
1.033	18.32.1						
	Constructing masonry chamber 30x30x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for stop cock, with C.I. surface box 100x100x75 mm (inside) with hinged cover fixed in cement concrete slab 1:2:4 mix (1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S (non modular) bricks of class designation 7.5						
	for inspection chamber						
		3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.034	50.18.9.21.4						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend						
	bend						
		10.000					10.000
	Total						**10.000**

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in no	**10.000**
1.035	50.18.9.21.9						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling						
	socket						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
1.036	18.59.2						
	Providing and fixing C.I double acting air valve of approved quality with bolts, nuts, rubber insertion etc. complete (The tail pieces, tapers etc. if required will be paid separately):80 mm dia						
	air valve						
		3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.037	50.18.9.6.2						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2						
	pipe line						
		100.000					100.000
	Total						**100.000**
						Total Quantity in metre	**100.000**
1.038	50.18.9.21						
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Elbow						
	elbow						
		10.000					10.000
	Total						**10.000**
						Total Quantity in no	**10.000**
1.039	50.18.9.21.5						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee						
	tee						
		10.000					10.000
	Total						**10.000**
						Total Quantity in no	**10.000**

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.040	18.15.2						
	Providing and fixing brass bib cock of approved quality :20 mm nominal bore						
	bib cock						
		20.000					20.000
	Total						**20.000**
						Total Quantity in each	**20.000**
1.041	18.60.1						
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore						
	water meter						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
2	Pile liners and miscellaneous items for piling						
2.001	12.22						
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.						
	6 mm liner 47.1 kg/m2						
		9.000	3.14*.606	47.1/1000	5.000		4.033
	Total						**4.033**
						Total Quantity in MT	**4.033**
2.002	OD1321/2022-2023						
	Driving down vertically M.s Liner already fabricated to the required depth by power winch and accessories including all hire charge of machinery , labour charges etc complete						
	6mm thk liner for piles						
		9.000	5.000				45.000
	Total						**45.000**
						Total Quantity in metre	**45.000**
2.003	OD1325/2022-2023						
	Supply, Fitting and Placing in position reinforcement in cages using HCR bar Reinforcement including cost of materials, labour charges, conveyance and placing the cages in bore holes providing precast cover blocks etc, complete as per Drawing and Technical Specificationsand as directed by Engineer in charge excluding cost of welding charges. Unit = 1 MT Taking output = 1 MT a) Material						
	for pile						

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	pile 80kg/m3	9.000	25.000	3.140	0.600	0.080000	33.912
	pile cap 120kg/m3	1.000	6.400	6.400	0.750	0.120000	3.686
	rounding	1.000	0.967				0.967
	Total						**38.565**
						Total Quantity in tonne	**38.565**
2.004	12.23.3						
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm						
	Piles						
		9.000	25.000				225.000
	Total						**225.000**
						Total Quantity in metre	**225.000**
3	Construction of Sump						
3.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	sump						
		1.000	6.600	6.600	1.500		65.340
	Total						**65.340**
						Total Quantity in cum	**65.340**
3.002	60.7.4						
	DR PACKING FOR APRONS - Rough stone dry packing for apron with good quality blasted rubble including packing to compactness to lines levels, cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site						
	sump						
		1.000	6.600	6.600	0.450		19.602
	Total						**19.602**
						Total Quantity in cum	**19.602**
3.003	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	for sump						
	foundation	1.000	6.600	6.600	0.150		6.534

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**6.534**
						Total Quantity in cum	**6.534**
3.004	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	for sump						
	base slab	4.000	6.600		0.150		3.960
	Total						**3.960**
						Total Quantity in sqm	**3.960**
3.005	5.9.2						
	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.						
	for sump						
	side wall inner	4.000	5.600		2.000		44.800
	side wall inner	4.000	2.700		2.000		21.600
	side wall outer	8.000	2.700		2.000		43.200
	side wall edges	8.000	1.000		2.000		16.000
	Total						**125.600**
						Total Quantity in sqm	**125.600**
3.006	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	for sump						
	covering slab	2.000	6.300	2.700			34.020
	Total						**34.020**
						Total Quantity in sqm	**34.020**
3.007	5.1.2						
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size						
	for sump						
	bed slab	1.000	6.300	6.300	0.200		7.938
	rounding	1.000	0.062				0.062
	Total						**8.000**
						Total Quantity in cum	**8.000**
3.008	5.2.2						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)						
	for sump						
	Side walls	8.000	2.700	0.200	2.000		8.640
	do-projections	8.000	0.350	0.350	2.000		1.960
	Side wall inner	1.000	5.600	0.200	2.000		2.240
	rounding	1.000	0.160				0.160
	Total						**13.000**
						Total Quantity in cum	**13.000**
3.009	5.3						
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).						
	for sump						
	covering slab	1.000	6.300	6.300	0.150		5.954
	rounding	1.000	0.046				0.046
	Total						**6.000**
						Total Quantity in cum	**6.000**
3.010	5.22.1						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelMild steel and Medium Tensile steel bars						
	for sump						
	For bed slab-80kg/m3	1.000	8.000			80.000000	640.000
	Total						**640.000**
						Total Quantity in kg	**640.000**
3.011	5.22A.1						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Mild steel and Medium Tensile steel bars						
	for sump						
	For side wall-120kg/m3	1.000	13.000			120.000000	1560.000
	For covering slab-100kg/m3	1.000	6.000			100.000000	600.000

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**2160.000**
						Total Quantity in kilogram	**2160.000**
3.012	50.13.1						
	9 mm cement plastering of mix : 1:3 (1 cement : 3 fine sand) including all cost of materials, labour charges etc complete						
	for sump						
	side walls outside	8.000	2.700		2.000		43.200
	do-projections	8.000	1.000		2.000		16.000
	Total						**59.200**
						Total Quantity in sqm	**59.200**
3.013	13.9.1						
	Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster						
	for sump						
	side walls inside	4.000	5.600		2.000		44.800
	side walls inside	4.000	2.700		2.000		21.600
	Total						**66.400**
						Total Quantity in sqm	**66.400**
3.014	50.18.9.19.2						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 m dia 4 Kgf/cm2 - External work - Exposed on wall						
	for sump						
		1.000	10.000				10.000
	Total						**10.000**
						Total Quantity in metre	**10.000**
3.015	50.18.9.8.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2						
	for sump						
		1.000	50.000				50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
3.016	50.18.9.18.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for sump						
		1.000	50.000				50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
3.017	50.18.7.6.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing . This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 6 Kgf/cm2 - Internal work- Exposed on wall						
	for sump						
		1.000	20.000				20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
3.018	50.18.9.6.2						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2						
	for sump						
		1.000	20.000				20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
3.019	50.18.9.21.4						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend						
	for sump						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
3.020	50.18.9.21.5						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee						
	for sump						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
3.021	50.18.9.21.8						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75 mm dia End cap						
	for sump						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
3.022	50.18.9.21.9						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling						
	for sump						
		2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
3.023	18.37.1						
	Constructing masonry chamber 60x45x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for water meter complete with C.I double flap surface box 400x200x200 mm (inside) with locking arrangement and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 grades stone aggregate 20 nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S. (non modular) bricks of class designation 7.5						
	Inspection Chamber						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
3.024	18.60.1						
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore						
	water meter						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

ABSTRACT ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Water Supply Arrangements in the Harbour-General Civil Work

Sl No	Specification	Quantity	Rate	Amount
1	**Construction of OH RCC Water Tank and Pump House**			
1.001	2.31			
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared			
	Net Total	400.000sqm	@14.48/sqm	5792.00
1.002	OD1292/2022-2023			
	Chipping and removing top of RCC piles to lines and levels carefully without damaging remaining portion of pile and removing debris upto a distance of 150 m including all labour charges , hire of equipments etc.complete as per directions of departmental officers at site Unit- cum Taking output - 1.25 cum			
	Net Total	2.543cum	@3537.94/cum	8996.98
1.003	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	65.340cum	@210.02/cum	13722.71
1.004	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	6.534cum	@6687.21/cum	43694.23
1.005	5.33.1			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level			
	Net Total	33.074cum	@9237.20/cum	305511.15
1.006	5.33.2			
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content			

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Sl No	Specification	Quantity	Rate	Amount
	as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level			
	Net Total	88.000cum	@10858.36/cum	955535.68
1.007	5.34.1			
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).			
	Net Total	121.074cum	@80.55/cum	9752.51
1.008	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	38.280sqm	@329.03/sqm	12595.27
1.009	OD5503/2024-2025			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - HCR Fe-500D or more			
	Net Total	13858.800kg	@96.62/kg	1339037.26
1.010	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	179.280sqm	@847.44/sqm	151929.04
1.011	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	200.160sqm	@800.47/sqm	160222.08
1.012	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	133.770sqm	@637.63/sqm	85295.77
1.013	50.6.7.2			
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.			
	Net Total	12.900cum	@7872.96/cum	101561.18
1.014	9.143			
	Providing and fixing factory made uPVC door frame, made of uPVC extruded			

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Sl No	Specification	Quantity	Rate	Amount
	section, of size 65 mm x 55 mm with wall thickness 2.0 mm (? 0.2mm), corners of the door frame to be mitred cut and jointed with plastic brackets and stainless steel screws, reinforcing hinge side vertical of the frames with PVC profile of Size 28 mm x 30 mm having wall thickness 2 mm (? 0.2 mm), including providing & fixing 3 nos of 125 mm long stainless steel hinges to the frame, fixing the frame with jamb with required number & size of anchor dash fastners, all complete as per manufacturer's specification and direction of Engineer-in-charge.			
	Net Total	6.500metre	@610.23/metre	3966.50
1.015	9.142.2			
	35 mm thick factory made Solid panel PVC Door shutter, made out of single piece extruded solid PVC (±0.2 mm) thick, having styles & rails (except lock rail) of size 95 mmx 35 mm x 5 mm, out of which 75 mm shall be flat and 20 mm shall be tapered (on both side), having one side thickness of 15 mm integrally extruded on the hinges side of the profile for better screw holding power, including reinforcing with MS tube of size 40 mm x 20 mm x 1 mm, joints of styles & rails to be mitered cut & joint with the help of PVC solvent cement, self driven self tapping screws & M.S. rectangular pipes bracket of size 190 mm x 100 mm of cross section size 35 mm x 17 mm s 1 mm at each corner. Single piece extruded 5 mm thick solid PVC Lock rail of size 115 mm x 35 mm x 35 mm, out of which 95 mm to be flat and 20 mm to be tapered at both ends, having 15 mm solid core in middle of rail section integrally extruded, fixing the styles & rails with the help of solvent and self driven self tapping screws of 125 mm x 11 mm, including providing 5 mm Single piece solid PVC extruded sheet inserted in the door as panel, all complete as per manufacturer's specification and direction of Engineer-in-charge.Decorative finish (wood grained finish)			
	Net Total	2.100sqm	@4438.67/sqm	9321.21
1.016	9.147.5			
	Providing and fixing factory made uPVC white colour casement/casement cum fixed glazed windows comprising of uPVC multi-chambered frame, sash and mullion (where ever required) extruded profiles duly reinforced with 1.60 +/- 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), uPVC extruded glazing beads of appropriate dimension, EPDM gasket, stainless steel (SS 304 grade) friction hinges, zinc alloy (white powder coated) casement handles, G.I fasteners 100 x 8 mm size for fixing frame to finished wall, plastic packers, plastic caps and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, mullion (if required) shall be also fusion welded including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, all complete as per approved drawing & direction of Engineer-in-Charge. (Single / double glass panes and silicon sealant shall be paid separately) Note: For uPVC frame, sash and mullion extruded profiles minus 5% tolerance in dimension i.e. in depth & width of profile shall be acceptable.Casement window double panels with S.S. friction hinges (350 x 19 x 1.9 mm) made of (big series)frame 67 x 60 mm & sash / mullion 67 x 80 mm both having wall thickness of 2.3 ± 0.2 mm and single glazing bead/ double glazing bead of appropriate dimension. (Area of window above 1.50 sqm).			
	Net Total	3.000sqm	@11164.86/sqm	33494.58

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Sl No	Specification	Quantity	Rate	Amount
1.017	9.7.7.1			
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick: Float glass panes4 mm thick glass pane			
	Net Total	2.240sqm	@2070.48/sqm	4637.88
1.018	9.100.2			
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm			
	Net Total	2.000no	@61.02/no	122.04
1.019	9.97.3			
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm			
	Net Total	4.000no	@103.95/no	415.80
1.020	50.9.15.2			
	Supplying and fixing 300 mm Aluminium aldrop			
	Net Total	1.000no	@188.93/no	188.93
1.021	13.7.2			
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:4 (1 cement : 4 fine sand)			
	Net Total	577.730sqm	@379.14/sqm	219040.55
1.022	13.15			
	20 mm cement plaster 1:2 (1 cement : 2 stone dust)			
	Net Total	3.000sqm	@476.55/sqm	1429.65
1.023	13.16.1			
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	151.640sqm	@262.57/sqm	39816.11
1.024	10.25.2			
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works			
	Net Total	4000.000kg	@151.29/kg	605160.00
1.025	13.43.1			
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer			

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Sl No	Specification	Quantity	Rate	Amount
	Net Total	729.370sqm	@69.33/sqm	50567.22
1.026	13.60.1			
	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade:Two or more coats on new work			
	Net Total	729.370sqm	@148.59/sqm	108377.09
1.027	50.18.9.9.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2			
	Net Total	150.000metre	@521.14/metre	78171.00
1.028	50.18.8.8.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 75 mm pipe 6 Kgf/cm2			
	Net Total	20.000metre	@614.17/metre	12283.40
1.029	18.17.5			
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :65 mm nominal bore			
	Net Total	5.000each	@1718.82/each	8594.10
1.030	50.18.9.8.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2			
	Net Total	1000.000metre	@356.56/metre	356560.00
1.031	50.18.7.4.2			
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall			
	Net Total	750.000metre	@295.71/metre	221782.50
1.032	18.17.2			
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :32 mm nominal bore			
	Net Total	10.000each	@671.37/each	6713.70
1.033	18.32.1			
	Constructing masonry chamber 30x30x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for stop cock, with C.I. surface box 100x100x75 mm (inside) with hinged cover fixed in cement concrete slab 1:2:4 mix (1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm			

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Sl No	Specification	Quantity	Rate	Amount
	nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S (non modular) bricks of class designation 7.5			
	Net Total	3.000each	@1827.73/each	5483.19
1.034	50.18.9.21.4			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend			
	Net Total	10.000no	@87.89/no	878.90
1.035	50.18.9.21.9			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling			
	Net Total	5.000no	@72.21/no	361.05
1.036	18.59.2			
	Providing and fixing C.I double acting air valve of approved quality with bolts, nuts, rubber insertion etc. complete (The tail pieces, tapers etc. if required will be paid separately):80 mm dia			
	Net Total	3.000no	@7208.30/no	21624.90
1.037	50.18.9.6.2			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2			
	Net Total	100.000metre	@240.68/metre	24068.00
1.038	50.18.9.21			
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Elbow			
	Net Total	10.000no	@94.28/no	942.80
1.039	50.18.9.21.5			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee			
	Net Total	10.000no	@94.65/no	946.50
1.040	18.15.2			
	Providing and fixing brass bib cock of approved quality :20 mm nominal bore			
	Net Total	20.000each	@377.04/each	7540.80
1.041	18.60.1			
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore			
	Net Total	1.000each	@4130.60/each	4130.60
			Heading Total(Rs)	5020264.86

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Sl No	Specification	Quantity	Rate	Amount
2	**Pile liners and miscellaneous items for piling**			
2.001	12.22			
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.			
	Net Total	4.033MT	@125636.20/MT	506690.79
2.002	OD1321/2022-2023			
	Driving down vertically M.s Liner already fabricated to the required depth by power winch and accessories including all hire charge of machinery , labour charges etc complete			
	Net Total	45.000metre	@568.30/metre	25573.50
2.003	OD1325/2022-2023			
	Supply, Fitting and Placing in position reinforcement in cages using HCR bar Reinforcement including cost of materials, labour charges, conveyance and placing the cages in bore holes providing precast cover blocks etc, complete as per Drawing and Technical Specificationsand as directed by Engineer in charge excluding cost of welding charges. Unit = 1 MT Taking output = 1 MT a) Material			
	Net Total	38.565tonne	@98321.63/tonne	3791773.66
2.004	12.23.3			
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm			
	Net Total	225.000metre	@7210.41/metre	1622342.25
			Heading Total(Rs)	5946380.20
3	**Construction of Sump**			
3.001	2.6.1			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil			
	Net Total	65.340cum	@210.02/cum	13722.71
3.002	60.7.4			
	DR PACKING FOR APRONS - Rough stone dry packing for apron with good quality blasted rubble including packing to compactness to lines levels, cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site			
	Net Total	19.602cum	@3557.50/cum	69734.12
3.003	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4			

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Sl No	Specification	Quantity	Rate	Amount
	coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	6.534cum	@6687.21/cum	43694.23
3.004	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			
	Net Total	3.960sqm	@329.03/sqm	1302.96
3.005	5.9.2			
	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.			
	Net Total	125.600sqm	@703.77/sqm	88393.51
3.006	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	34.020sqm	@800.47/sqm	27231.99
3.007	5.1.2			
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size			
	Net Total	8.000cum	@8914.94/cum	71319.52
3.008	5.2.2			
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)			
	Net Total	13.000cum	@10748.82/cum	139734.66
3.009	5.3			
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).			
	Net Total	6.000cum	@11277.61/cum	67665.66
3.010	5.22.1			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelMild steel and Medium Tensile steel bars			
	Net Total	640.000kg	@94.84/kg	60697.60
3.011	5.22A.1			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Mild steel and Medium			

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Sl No	Specification	Quantity	Rate	Amount
	Tensile steel bars			
	Net Total	2160.000kilogram	@94.84/kilogram	204854.40
3.012	50.13.1			
	9 mm cement plastering of mix : 1:3 (1 cement : 3 fine sand) including all cost of materials, labour charges etc complete			
	Net Total	59.200sqm	@285.84/sqm	16921.73
3.013	13.9.1			
	Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster			
	Net Total	66.400sqm	@404.42/sqm	26853.49
3.014	50.18.9.19.2			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 m dia 4 Kgf/cm2 - External work - Exposed on wall			
	Net Total	10.000metre	@329.39/metre	3293.90
3.015	50.18.9.8.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2			
	Net Total	50.000metre	@356.56/metre	17828.00
3.016	50.18.9.18.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall			
	Net Total	50.000metre	@279.39/metre	13969.50
3.017	50.18.7.6.2			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing . This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 6 Kgf/cm2 - Internal work- Exposed on wall			
	Net Total	20.000metre	@369.84/metre	7396.80
3.018	50.18.9.6.2			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2			
	Net Total	20.000metre	@240.68/metre	4813.60
3.019	50.18.9.21.4			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend			

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Sl No	Specification	Quantity	Rate	Amount
	Net Total	5.000no	@87.89/no	439.45
3.020	50.18.9.21.5			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee			
	Net Total	5.000no	@94.65/no	473.25
3.021	50.18.9.21.8			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75 mm dia End cap			
	Net Total	1.000no	@64.08/no	64.08
3.022	50.18.9.21.9			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling			
	Net Total	2.000no	@72.21/no	144.42
3.023	18.37.1			
	Constructing masonry chamber 60x45x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for water meter complete with C.I double flap surface box 400x200x200 mm (inside) with locking arrangement and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 grades stone aggregate 20 nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S. (non modular) bricks of class designation 7.5			
	Net Total	1.000each	@9587.28/each	9587.28
3.024	18.60.1			
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore			
	Net Total	1.000each	@4130.60/each	4130.60
			Heading Total(Rs)	894267.46
			Total Estimation PAC	11860912.52

Sl No	Description	Percentage/LS	Amount
4	**Lumsum Heading**		
4.001	LS provision for part TS		
	0.00	0.00%	2000000.00
4.002	Water connection charges (KWA)		
	0.00	0.00%	1000000.00
4.003	LS Amount for Electrification		
	0.00	0.00%	1900000.00
		Total Lumsum Amount	4900000.00

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Sl No	Specification	Quantity	Rate	Amount
5	**Extra Charges**			
4.001	Provision for GST			
		11860912.52	18.00%	2134964.25
			Grand Total	18895876.77
			Round off	4123.23
			Rounded Total(Rs)	18900000.00
	Rupees One Crore Eighty Nine Lakh			

ePRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

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DETAILED ESTIMATE

GENERAL-Ajanur Fishing Harbour-Construction of Ajanur Fishing Harbour in Kasaragod District- Water Supply Arrangements in the Harbour-General Civil Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Construction of OH RCC Water Tank and Pump House						
1.001	2.31						
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared						
	site clearance						
		1.000	20.000	20.000			400.000
	Total						**400.000**
						Total Quantity in sqm	**400.000**
1.002	OD1292/2022-2023						
	Chipping and removing top of RCC piles to lines and levels carefully without damaging remaining portion of pile and removing debris upto a distance of 150 m including all labour charges , hire of equipments etc.complete as per directions of departmental officers at site Unit- cum Taking output - 1.25 cum						
	for pile						
		9.000	3.140/4	.6*.6	1.000	1.000000	2.543
	Total						**2.543**
						Total Quantity in cum	**2.543**
1.003	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	for pile cap						
		1.000	6.600	6.600	1.500		65.340
	Total						**65.340**
						Total Quantity in cum	**65.340**
1.004	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	for pile pcc						
		1.000	6.600	6.600	0.150		6.534
	Total						**6.534**

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**6.534**
1.005	5.33.1						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work upto plinth level						
	column upto GL and footing						
	column upto GL	9.000	0.600	0.600	0.700		2.268
	Raft	1.000	6.400	6.400	0.750		30.720
	rounding	1.000	0.086				0.086
	Total						**33.074**
						Total Quantity in cum	**33.074**
1.006	5.33.2						
	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer - in-charge. Note:- Cement content considered in this item is @ 330 kg/ cum. Excess or less cement used as per design mix is payable or recoverable separately.All work above plinth level upto floor V level						
	columns and walls						
	column from GL to top	9.000	0.400	0.400	12.450		17.928
	Wall of water tank	2.000	6.000	0.250	3.000		9.000
		2.000	5.600	0.250	3.000		8.400
	rounding	1.000	2.672				2.672
	Total						**38.000**
	Beams and slab						
	tie beams	12*3	2.400	0.300	0.300		7.776
	haunch	24*3	0.300	0.300	0.300		1.944
	bottom slab for tank	1.000	7.600	7.600	0.250		14.440
	bottom beam for slab	3.000	6.000	0.300	0.300		1.620
		3.000	5.100	0.300	0.300		1.377

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	top slab cover	1.000	6.000	6.000	0.120		4.320
	slab on GF	1.000	7.600	7.600	0.150		8.664
	slab projections	2*4	7.600	0.800	0.150		7.296
	lintel GF	1.000	6.000	0.200	0.200		0.240
	sunshade GF	1.000	6.000	0.600	0.100		0.360
	rounding	1.000	1.963				1.963
	Total						**50.000**
						Total Quantity in cum	**88.000**
1.007	5.34.1						
	Extra for providing richer mixes at all floor levels. Note:- Excess/less cement over the specified cement content used is payable/ recoverable separately.Providing M-30 grade concrete instead of M-25 grade BMC/RMC. (Note:- Cement content considered in M-30 is @ 340 kg/cum).						
	column upto GL and footing						
	column upto GL	9.000	0.600	0.600	0.700		2.268
	Raft	1.000	6.400	6.400	0.750		30.720
	rounding	1.000	0.086				0.086
	Total						**33.074**
	columns and walls						
	column from GL to top	9.000	0.400	0.400	12.450		17.928
	Wall of water tank	2.000	6.000	0.250	3.000		9.000
		2.000	5.600	0.250	3.000		8.400
	rounding	1.000	2.672				2.672
	Total						**38.000**
	Beams and slab						
	tie beams	12*3	2.400	0.300	0.300		7.776
	haunch	24*3	0.300	0.300	0.300		1.944
	bottom slab for tank	1.000	7.600	7.600	0.250		14.440
	bottom beam for slab	3.000	6.000	0.300	0.300		1.620
		3.000	5.100	0.300	0.300		1.377
	top slab cover	1.000	6.000	6.000	0.120		4.320
	slab on GF	1.000	7.600	7.600	0.150		8.664
	slab projections	2*4	7.600	0.800	0.150		7.296
	lintel GF	1.000	6.000	0.200	0.200		0.240
	sunshade GF	1.000	6.000	0.600	0.100		0.360

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rounding	1.000	1.963				1.963
	Total						**50.000**
						Total Quantity in cum	**121.074**
1.008	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	for pile cap						
	for pcc	4.000	6.600		0.150		3.960
	for pile cap	4.000	6.400		0.750		19.200
	column upto GL	9.000	2.400		0.700		15.120
	Total						**38.280**
						Total Quantity in sqm	**38.280**
1.009	OD5503/2024-2025						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - HCR Fe-500D or more						
	Reinforcement						
		1.000	38.000			120.000000	4560.000
		1.000	50.000			120.000000	6000.000
	Total						**10560.000**
	column						
	column upto GL	9.000	0.600	0.600	0.700	100.000000	226.800
	Raft	1.000	6.400	6.400	0.750	100.000000	3072.000
	Total						**3298.800**
						Total Quantity in kg	**13858.800**
1.010	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	column						
		9.000	1.600		12.450		179.280
	Total						**179.280**
						Total Quantity in sqm	**179.280**
1.011	5.9.3						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	slabs						
	bottom slab for tank	1.000	7.600	7.600			57.760
	top slab cover	1.000	6.000	6.000			36.000
	slab on GF	1.000	7.600	7.600			57.760
	slab projections	2*4	7.600	0.800			48.640
	Total						**200.160**
						Total Quantity in sqm	**200.160**
1.012	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	beams						
	tie beams	12*3	2.400	0.900			77.760
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	lintel GF	1.000	6.000	0.400			2.400
	Sunshade GF	1.000	6.000	0.700			4.200
	Total						**133.770**
						Total Quantity in sqm	**133.770**
1.013	50.6.7.2						
	Laterate masonry with neatly dressed laterate stone of size 40x20x15cm or nearest size in cement mortar 1:6 for super structure above plinth level up to floor two level including all cost of materials, labour charges etc.						
	Pump house at GF						
	long wall	2.000	6.000	0.200	3.000		7.200
	cross wall	2.000	5.600	0.200	3.000		6.720
	Total						**13.920**
	deduction						
	door	-1.000	1.000	0.200	2.100		-0.420
	window	-1.000	2.000	0.200	1.500		-0.600
	Total						**-1.020**
						Total Quantity in cum	**12.900**
1.014	9.143						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing factory made uPVC door frame, made of uPVC extruded section, of size 65 mm x 55 mm with wall thickness 2.0 mm (? 0.2mm), corners of the door frame to be mitred cut and jointed with plastic brackets and stainless steel screws, reinforcing hinge side vertical of the frames with PVC profile of Size 28 mm x 30 mm having wall thickness 2 mm (? 0.2 mm), including providing & fixing 3 nos of 125 mm long stainless steel hinges to the frame, fixing the frame with jamb with required number & size of anchor dash fastners, all complete as per manufacturer's specification and direction of Engineer-in-charge.						
	door						
		1.000	6.500				6.500
	Total						**6.500**
						Total Quantity in metre	**6.500**
1.015	9.142.2						
	35 mm thick factory made Solid panel PVC Door shutter, made out of single piece extruded solid PVC (±0.2 mm) thick, having styles & rails (except lock rail) of size 95 mmx 35 mm x 5 mm, out of which 75 mm shall be flat and 20 mm shall be tapered (on both side), having one side thickness of 15 mm integrally extruded on the hinges side of the profile for better screw holding power, including reinforcing with MS tube of size 40 mm x 20 mm x 1 mm, joints of styles & rails to be mitered cut & joint with the help of PVC solvent cement, self driven self tapping screws & M.S. rectangular pipes bracket of size 190 mm x 100 mm of cross section size 35 mm x 17 mm s 1 mm at each corner. Single piece extruded 5 mm thick solid PVC Lock rail of size 115 mm x 35 mm x 35 mm, out of which 95 mm to be flat and 20 mm to be tapered at both ends, having 15 mm solid core in middle of rail section integrally extruded, fixing the styles & rails with the help of solvent and self driven self tapping screws of 125 mm x 11 mm, including providing 5 mm Single piece solid PVC extruded sheet inserted in the door as panel, all complete as per manufacturer's specification and direction of Engineer-in-charge.Decorative finish (wood grained finish)						
	door						
		1.000	1.000		2.100		2.100
	Total						**2.100**
						Total Quantity in sqm	**2.100**
1.016	9.147.5						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing factory made uPVC white colour casement/casement cum fixed glazed windows comprising of uPVC multi-chambered frame, sash and mullion (where ever required) extruded profiles duly reinforced with 1.60 +/- 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), uPVC extruded glazing beads of appropriate dimension, EPDM gasket, stainless steel (SS 304 grade) friction hinges, zinc alloy (white powder coated) casement handles, G.I fasteners 100 x 8 mm size for fixing frame to finished wall, plastic packers, plastic caps and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, mullion (if required) shall be also fusion welded including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, all complete as per approved drawing & direction of Engineer-in-Charge. (Single / double glass panes and silicon sealant shall be paid separately) Note: For uPVC frame, sash and mullion extruded profiles minus 5% tolerance in dimension i.e. in depth & width of profile shall be acceptable.Casement window double panels with S.S. friction hinges (350 x 19 x 1.9 mm) made of (big series)frame 67 x 60 mm & sash / mullion 67 x 80 mm both having wall thickness of 2.3 ± 0.2 mm and single glazing bead/ double glazing bead of appropriate dimension. (Area of window above 1.50 sqm).						
	window						
		1.000	2.000		1.500		3.000
	Total						**3.000**
						Total Quantity in sqm	**3.000**
1.017	9.7.7.1						
	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured), Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick: Float glass panes4 mm thick glass pane						
	window						
		4.000	0.400		1.400		2.240
	Total						**2.240**
						Total Quantity in sqm	**2.240**
1.018	9.100.2						
	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete:100 mm						
	door						
		2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.019	9.97.3						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing aluminium tower bolts, ISI marked, anodised(anodic coating not less than grade AC 10 as per : 1868), transparent or dyed to required colour or shade, with necessary screws complete:200x10 mm						
	door						
		4.000					4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.020	50.9.15.2						
	Supplying and fixing 300 mm Aluminium aldrop						
	for door						
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.021	13.7.2						
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:4 (1 cement : 4 fine sand)						
	plastering						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	Total						**448.730**
	pump house						
	long wall	2*2	6.000		3.000		72.000
	cross wall	2*2	5.600		3.000		67.200
	door	-1*2	1.000		2.100		-4.200
	window	-1*2	2.000		1.500		-6.000
	Total						**129.000**
						Total Quantity in sqm	**577.730**
1.022	13.15						
	20 mm cement plaster 1:2 (1 cement : 2 stone dust)						

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Inside water tank						
	Floor of slab (excluding haunch)	1.000					1.000
	Vertical sides	1.000					1.000
	Haunchings	1.000					1.000
	Total						**3.000**
						Total Quantity in sqm	**3.000**
1.023	13.16.1						
	6 mm cement plaster of mix:1:3 (1 cement : 3 fine sand)						
	ceiling						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**151.640**
1.024	10.25.2						
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works						
	For Ladder						
	Ladder for (Stage height 12.45 m)	4.000	1000.000			1.000000	4000.000
	Total						**4000.000**
						Total Quantity in kg	**4000.000**
1.025	13.43.1						
	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer						
	painting						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200

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Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	pump house-long wall	2*2	6.000		3.000		72.000
	do-cross wall	2*2	5.600		3.000		67.200
	do-door	-1*2	1.000		2.100		-4.200
	do-window	-1*2	2.000		1.500		-6.000
	Total						**577.730**
	painting ceilings						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**729.370**
1.026	13.60.1						
	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade:Two or more coats on new work						
	painting						
	tie beams	12*3	2.400	0.900			77.760
	column	9.000	12.450	1.600			179.280
	haunch	24*3	0.300	0.900			19.440
	bottom beam for slab	3.000	6.000	0.900			16.200
		3.000	5.100	0.900			13.770
	Sunshade GF	1.000	6.000	0.700			4.200
	tank	2*2	6.000	2.200			52.800
	tank	2*2	5.600	2.200			49.280
	tank bottom slab- top side	1.000	6.000	6.000			36.000
	pump house-long wall	2*2	6.000		3.000		72.000
	do-cross wall	2*2	5.600		3.000		67.200
	do-door	-1*2	1.000		2.100		-4.200

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	do-window	-1*2	2.000		1.500		-6.000
	Total						**577.730**
	painting ceiling						
	pump house GF	1.000	5.400	5.400			29.160
	tank bottom slab-bottom side	1.000	5.400	5.400			29.160
	covering slab	1.000	5.600	5.600			31.360
	sunshade	1.000	6.000	0.700			4.200
	slab projection	2*4	7.600	0.950			57.760
	Total						**151.640**
						Total Quantity in sqm	**729.370**
1.027	50.18.9.9.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2						
	pipe line						
		150.000					150.000
	Total						**150.000**
						Total Quantity in metre	**150.000**
1.028	50.18.8.8.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 75 mm pipe 6 Kgf/cm2						
	pipe line						
		20.000					20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
1.029	18.17.5						
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :65 mm nominal bore						
	for supply lines						
		5.000					5.000
	Total						**5.000**
						Total Quantity in each	**5.000**
1.030	50.18.9.8.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2						

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(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	supply line						
		1000.000					1000.000
	Total						**1000.000**
						Total Quantity in metre	**1000.000**
1.031	50.18.7.4.2						
	Providing and fixing PVC, pipes fittings including fixing the pipe with clamps at 1.00 m spacing. this includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 6 Kgf/cm2 - internal work- Exposed on wall						
	pipe line						
		1.000	750.000				750.000
	Total						**750.000**
						Total Quantity in metre	**750.000**
1.032	18.17.2						
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :32 mm nominal bore						
	for supply lines						
		10.000					10.000
	Total						**10.000**
						Total Quantity in each	**10.000**
1.033	18.32.1						
	Constructing masonry chamber 30x30x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for stop cock, with C.I. surface box 100x100x75 mm (inside) with hinged cover fixed in cement concrete slab 1:2:4 mix (1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S (non modular) bricks of class designation 7.5						
	for inspection chamber						
		3.000					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
1.034	50.18.9.21.4						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend						
	bend						
		10.000					10.000
	Total						**10.000**

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in no	**10.000**
1.035	50.18.9.21.9						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling						
	socket						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
1.036	18.59.2						
	Providing and fixing C.I double acting air valve of approved quality with bolts, nuts, rubber insertion etc. complete (The tail pieces, tapers etc. if required will be paid separately):80 mm dia						
	air valve						
		3.000					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
1.037	50.18.9.6.2						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2						
	pipe line						
		100.000					100.000
	Total						**100.000**
						Total Quantity in metre	**100.000**
1.038	50.18.9.21						
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Elbow						
	elbow						
		10.000					10.000
	Total						**10.000**
						Total Quantity in no	**10.000**
1.039	50.18.9.21.5						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee						
	tee						
		10.000					10.000
	Total						**10.000**
						Total Quantity in no	**10.000**

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.040	18.15.2						
	Providing and fixing brass bib cock of approved quality :20 mm nominal bore						
	bib cock						
		20.000					20.000
	Total						**20.000**
						Total Quantity in each	**20.000**
1.041	18.60.1						
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore						
	water meter						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
2	Pile liners and miscellaneous items for piling						
2.001	12.22						
	Providing Steel Liner 10mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing.						
	6 mm liner 47.1 kg/m2						
		9.000	3.14*.606	47.1/1000	5.000		4.033
	Total						**4.033**
						Total Quantity in MT	**4.033**
2.002	OD1321/2022-2023						
	Driving down vertically M.s Liner already fabricated to the required depth by power winch and accessories including all hire charge of machinery , labour charges etc complete						
	6mm thk liner for piles						
		9.000	5.000				45.000
	Total						**45.000**
						Total Quantity in metre	**45.000**
2.003	OD1325/2022-2023						
	Supply, Fitting and Placing in position reinforcement in cages using HCR bar Reinforcement including cost of materials, labour charges, conveyance and placing the cages in bore holes providing precast cover blocks etc, complete as per Drawing and Technical Specificationsand as directed by Engineer in charge excluding cost of welding charges. Unit = 1 MT Taking output = 1 MT a) Material						
	for pile						

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	pile 80kg/m3	9.000	25.000	3.140	0.600	0.080000	33.912
	pile cap 120kg/m3	1.000	6.400	6.400	0.750	0.120000	3.686
	rounding	1.000	0.967				0.967
	Total						**38.565**
						Total Quantity in tonne	**38.565**
2.004	12.23.3						
	Bored cast-in-situ M35 grade R.C.C. Pile Using Batching Plant, Transit Mixer and Concrete Pump excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m. Pile diameter-750 mm						
	Piles						
		9.000	25.000				225.000
	Total						**225.000**
						Total Quantity in metre	**225.000**
3	Construction of Sump						
3.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	sump						
		1.000	6.600	6.600	1.500		65.340
	Total						**65.340**
						Total Quantity in cum	**65.340**
3.002	60.7.4						
	DR PACKING FOR APRONS - Rough stone dry packing for apron with good quality blasted rubble including packing to compactness to lines levels, cost and conveyance of all materials labour charges etc. complete as per direction of Departmental officers at site						
	sump						
		1.000	6.600	6.600	0.450		19.602
	Total						**19.602**
						Total Quantity in cum	**19.602**
3.003	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	for sump						
	foundation	1.000	6.600	6.600	0.150		6.534

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**6.534**
						Total Quantity in cum	**6.534**
3.004	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	for sump						
	base slab	4.000	6.600		0.150		3.960
	Total						**3.960**
						Total Quantity in sqm	**3.960**
3.005	5.9.2						
	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.						
	for sump						
	side wall inner	4.000	5.600		2.000		44.800
	side wall inner	4.000	2.700		2.000		21.600
	side wall outer	8.000	2.700		2.000		43.200
	side wall edges	8.000	1.000		2.000		16.000
	Total						**125.600**
						Total Quantity in sqm	**125.600**
3.006	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	for sump						
	covering slab	2.000	6.300	2.700			34.020
	Total						**34.020**
						Total Quantity in sqm	**34.020**
3.007	5.1.2						
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size						
	for sump						
	bed slab	1.000	6.300	6.300	0.200		7.938
	rounding	1.000	0.062				0.062
	Total						**8.000**
						Total Quantity in cum	**8.000**
3.008	5.2.2						

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)						
	for sump						
	Side walls	8.000	2.700	0.200	2.000		8.640
	do-projections	8.000	0.350	0.350	2.000		1.960
	Side wall inner	1.000	5.600	0.200	2.000		2.240
	rounding	1.000	0.160				0.160
	Total						**13.000**
						Total Quantity in cum	**13.000**
3.009	5.3						
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).						
	for sump						
	covering slab	1.000	6.300	6.300	0.150		5.954
	rounding	1.000	0.046				0.046
	Total						**6.000**
						Total Quantity in cum	**6.000**
3.010	5.22.1						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelMild steel and Medium Tensile steel bars						
	for sump						
	For bed slab-80kg/m3	1.000	8.000			80.000000	640.000
	Total						**640.000**
						Total Quantity in kg	**640.000**
3.011	5.22A.1						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Mild steel and Medium Tensile steel bars						
	for sump						
	For side wall-120kg/m3	1.000	13.000			120.000000	1560.000
	For covering slab-100kg/m3	1.000	6.000			100.000000	600.000

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**2160.000**
						Total Quantity in kilogram	**2160.000**
3.012	50.13.1						
	9 mm cement plastering of mix : 1:3 (1 cement : 3 fine sand) including all cost of materials, labour charges etc complete						
	for sump						
	side walls outside	8.000	2.700		2.000		43.200
	do-projections	8.000	1.000		2.000		16.000
	Total						**59.200**
						Total Quantity in sqm	**59.200**
3.013	13.9.1						
	Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster						
	for sump						
	side walls inside	4.000	5.600		2.000		44.800
	side walls inside	4.000	2.700		2.000		21.600
	Total						**66.400**
						Total Quantity in sqm	**66.400**
3.014	50.18.9.19.2						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 m dia 4 Kgf/cm2 - External work - Exposed on wall						
	for sump						
		1.000	10.000				10.000
	Total						**10.000**
						Total Quantity in metre	**10.000**
3.015	50.18.9.8.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2						
	for sump						
		1.000	50.000				50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
3.016	50.18.9.18.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/clips at 1.00 m spacing. This included jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 75 mm dia 6Kgf/cm2 - External work- Exposed on wall						

EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for sump						
		1.000	50.000				50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
3.017	50.18.7.6.2						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing . This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 50 mm dia 6 Kgf/cm2 - Internal work- Exposed on wall						
	for sump						
		1.000	20.000				20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
3.018	50.18.9.6.2						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 50 mm dia 6 Kgf/cm2						
	for sump						
		1.000	20.000				20.000
	Total						**20.000**
						Total Quantity in metre	**20.000**
3.019	50.18.9.21.4						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Bend						
	for sump						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
3.020	50.18.9.21.5						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75x75x75 mm dia Tee						
	for sump						
		5.000					5.000
	Total						**5.000**
						Total Quantity in no	**5.000**
3.021	50.18.9.21.8						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -75 mm dia End cap						
	for sump						

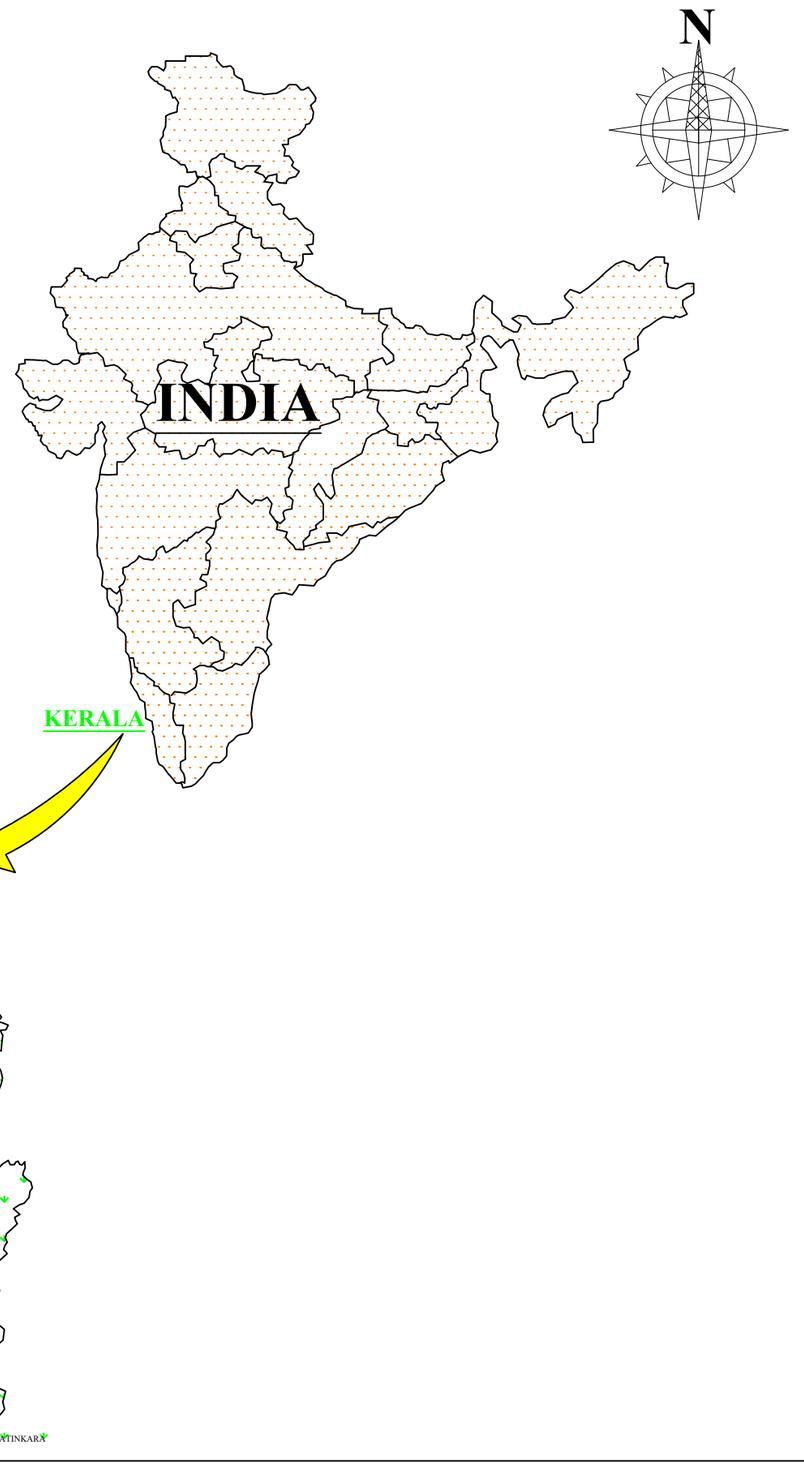
EST No. :HED/CEHED/EST/105/2022_5_11_10 (Edit Id : 6)
(Dsor year : 2018,Cost Index (Place : Kasaragod,Value : 133.05),GST : 18%

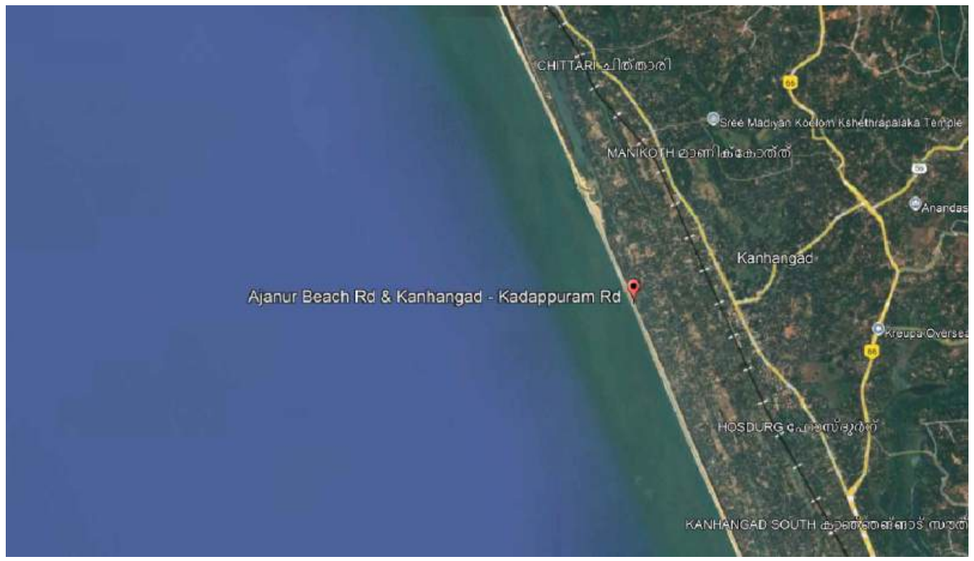
Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		1.000					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
3.022	50.18.9.21.9						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 75 mm dia Socket /coupling						
	for sump						
		2.000					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
3.023	18.37.1						
	Constructing masonry chamber 60x45x50 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for water meter complete with C.I double flap surface box 400x200x200 mm (inside) with locking arrangement and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 grades stone aggregate 20 nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design:With common burnt clay F.P.S. (non modular) bricks of class designation 7.5						
	Inspection Chamber						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
3.024	18.60.1						
	Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately):80 mm dia nominal bore						
	water meter						
		1.000					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**

DRAWINGS

File No. HECE/207/2022-DR8 (Computer No. 19397)

Generated from eOffice by Gouri L, AE(C5)HED, AE(C5) HED, HARBOUR ENGINEERING DEPARTMENT on 18/06/2026 06:27 PM



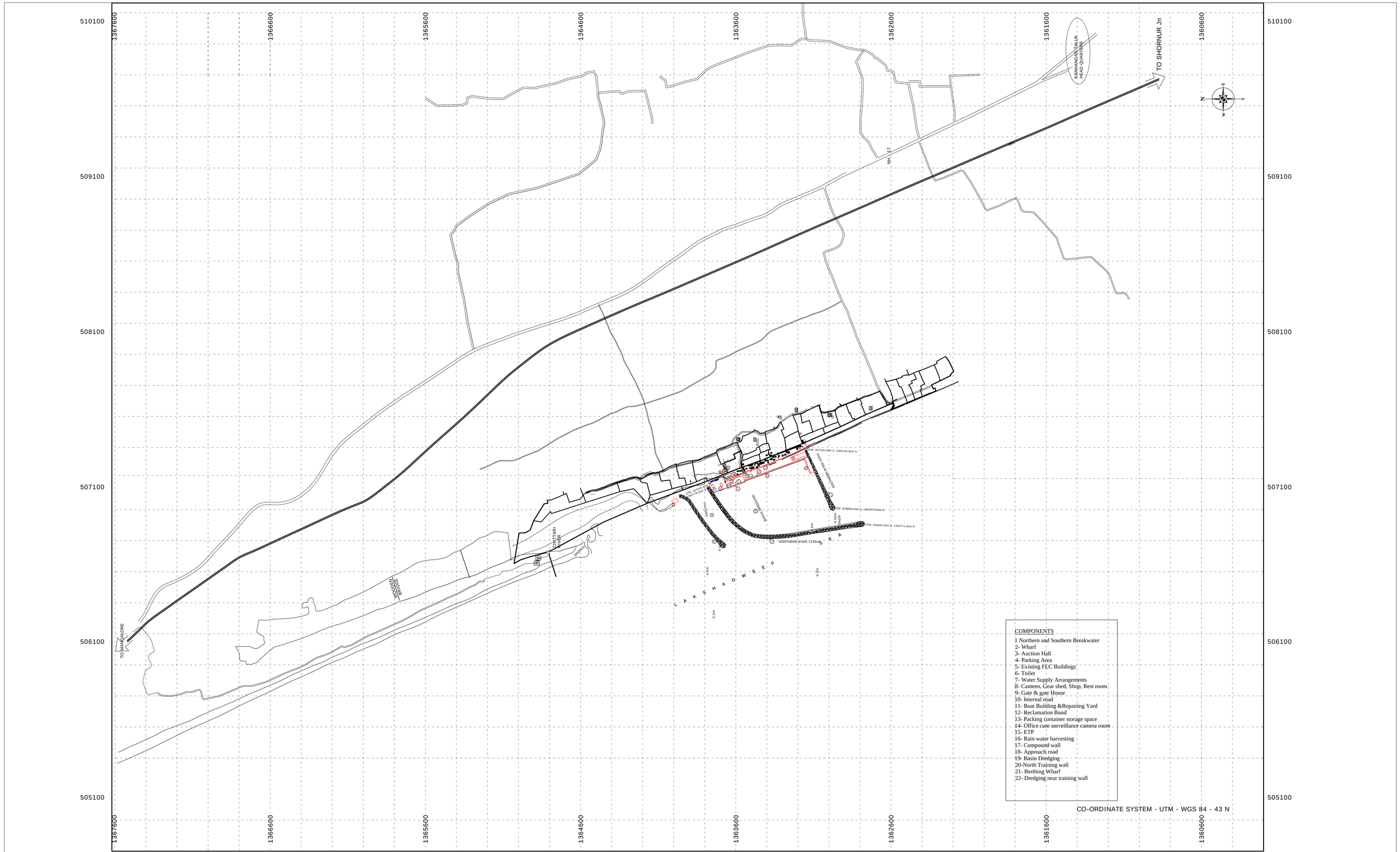


NAME OF PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

DATE:		DWG NO:	01/24/AJNR	**ASSISTANT ENGINEER:** SIGNATURE:		**ASSISTANT EXECUTIVE ENGINEER:** SIGNATURE:			
		DRAWN:							
TYPE:		**REVISION**			450	**EXECUTIVE ENGINEER:** SIGNATURE:	**SUPERINTENDING ENGINEER:** SIGNATURE:	**CHIEF ENGINEER:** SIGNATURE:	
TITLE:	LOCATION MAP								

2084710025-T-HED



KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	2/ 24 / AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:8000		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	LAYOUT				

File No: HED/2/2013/2022-DRM, Computer No: 163611
Generated from eOffice by Gisan L, HED(SA-HED, AE(CE)-HED, HARBOUR ENGINEERING DEPARTMENT on 8/28/2026 06:27 PM

506100 507100 508100

1363600

1362600

N W E S

LAKSHADWEEP SEA

UTM: 507045.00m E, 1363778.00m N

DREDGING

-4.5m

-5.0m

-4.0m

BASIN DREDGING

1150 m

NORTHERN B/WS 1150m

-4.5m

-5.0m

-4.50m Depth

UTM: 506809.00m E, 1362771.00m N

SOUTHERN B/WS 425m

UTM: 506896.00m E, 1362970.00m N

UTM: 507282.00m E, 1363149.00m N

Crescent school
Aswar kadapuram

Sri Kurumba

Rahmaniya Masjid

Anganvadi

COMPONENTS

1 Northern and Southern Breakwater
2- Wharf
3- Auction Hall
4- Parking Area
5- Existing FLC Buildings
6- Toilet
7- Water Supply Arrangements
8- Canteen, Gear shed, Shop, Rest room
9- Gate & gate House
10- Internal road
11- Boat Building &Repairing Yard
12- Reclamation Bund
13- Packing container storage space
14- Office cum surveillance camera room
15- ETP
16- Rain water harvesting
17- Compound wall
18- Approach road
19- Basin Dredging
20-North Training wall
21- Berthing Wharf
22- Dredging near training wall

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	2(a)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:2500		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	PROPOSED LAYOUT		452		

506100 507100 508100

1363600

1362600

N W E S

UTM: 507045.00m E, 1363778.00m N

DREDGING

-4.0m

BASIN DREDGING

1150 m

NORTHERN B/WS 1150m

-4.5m

-4.50m Depth

UTM: 506809.00m E, 1362771.00m N

SOUTHERN B/WS 425m

UTM: 506896.00m E, 1362970.00m N

UTM: 507282.00m E, 1363149.00m N

Crescent school
Aanur kadapuram

Sri kurumba

Rahmaniya Masjid

Anganvadi

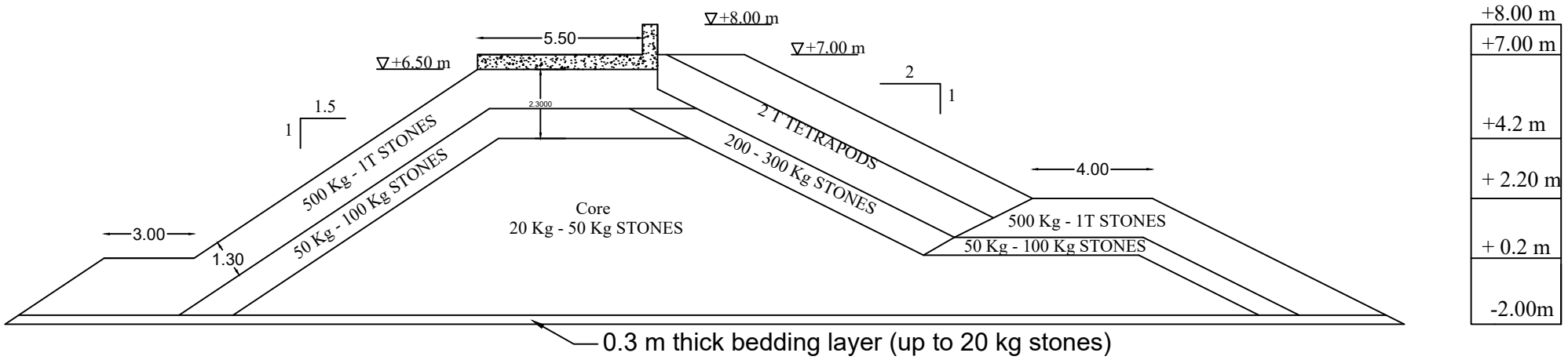
COMPONENTS

1 Northern and Southern Breakwater
2- Wharf
3- Auction Hall
4- Parking Area
5- Existing FLC Buildings
6- Toilet
7- Water Supply Arrangements
8- Canteen, Gear shed, Shop, Rest room
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12- Reclamation Bund
13- Packing container storage space
14- Office cum surveillance camera room
15- ETP
16- Rain water harvesting
17- Compound wall
18- Approach road
19- Basin Dredging
20-North Training wall
21- Berthing Wharf
22- Dredging near training wall

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	2(b) /24/ AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:2500		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	LAYOUT WITH CONTOUR		453		



Trunk section at -2.0 m Bed Level

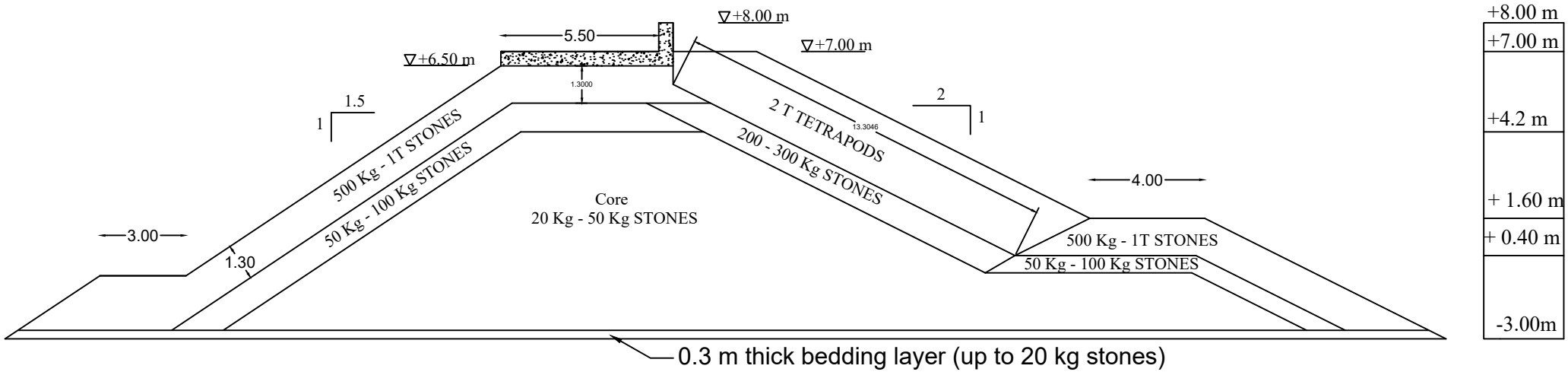
5 - 10kg Stones	13.84 sqm
20 - 50kg Stones	112.86 sqm
50 - 100kg Stones	24.19 sqm
200 - 300kg Stones	10.29 sqm
500 Kg - 1T Stones	47.50 sqm
2 T Tetrapods	11.07 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO:	3(a)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:200		
TYPE:	Break water and river training	REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE / CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -2.0 m bed level				

File No. HECE/[illegible] Generated from [illegible] by [illegible] KERALA STATE HARBOUR ENGINEERING DEPARTMENT on 19/06/2026 06:27 PM



Trunk section at -3.0 m Bed Level

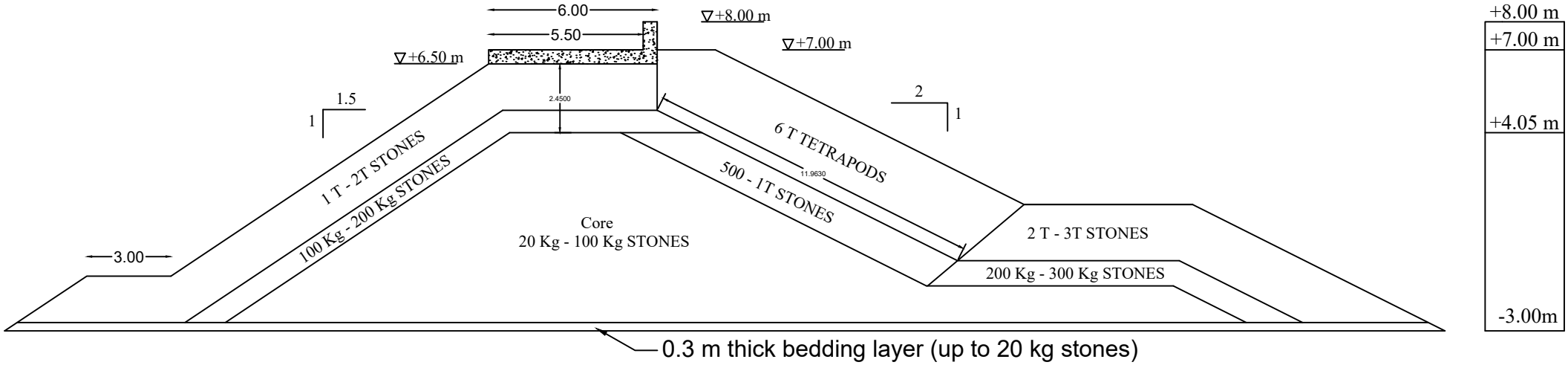
5 - 10kg Stones	14.89 sqm
20 - 50kg Stones	141.63 sqm
50 - 100kg Stones	25.99 sqm
200 - 300kg Stones	12.52 sqm
500 Kg - 1T Stones	49.84 sqm
2 T Tetrapods	13.30 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO:	3(b)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:200		
TYPE:	Break water and river training	REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE / CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -3.0 m bed level				

File No. HECE/207/2022-DR8 (Computer No. 19397)
Generated from eOffice by Gouri L, AE(C5)HED, AE(C5) HED, HARBOUR ENGINEERING DEPARTMENT on 18/03/2025 10:07 AM



Trunk section at -3.0 m Bed Level

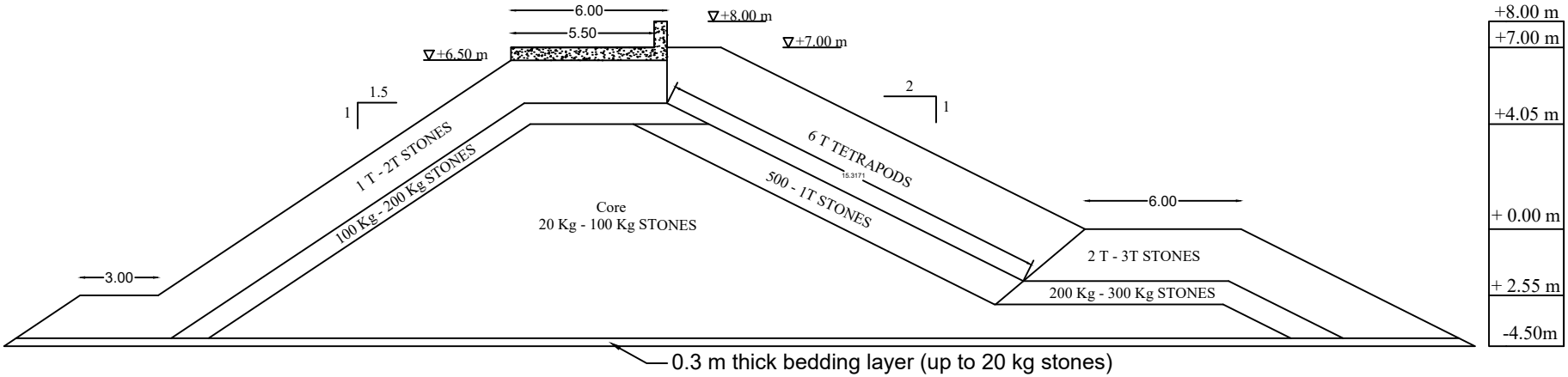
5 - 10kg Stones	15.24 sqm
20 - 100kg Stones	117.84 sqm
10 - 200kg Stones	15.26 sqm
200 - 300kg Stones	11.03 sqm
500 Kg - 1T Stones	14.45 sqm
1T - 2 T Stones	39.35 sqm
2T - 3 T Stones	28.21 sqm
6 T Tetrapods	12.00 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO:	3(c)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:200		
TYPE:	Break water and river training	REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE / CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -3.0 m bed level				

File No. HECE/2... Generated from ... by ... on ... HARBOUR ENGINEERING DEPARTMENT on 19/06/2026 06:27 PM



Trunk section at -4.5 m Bed Level

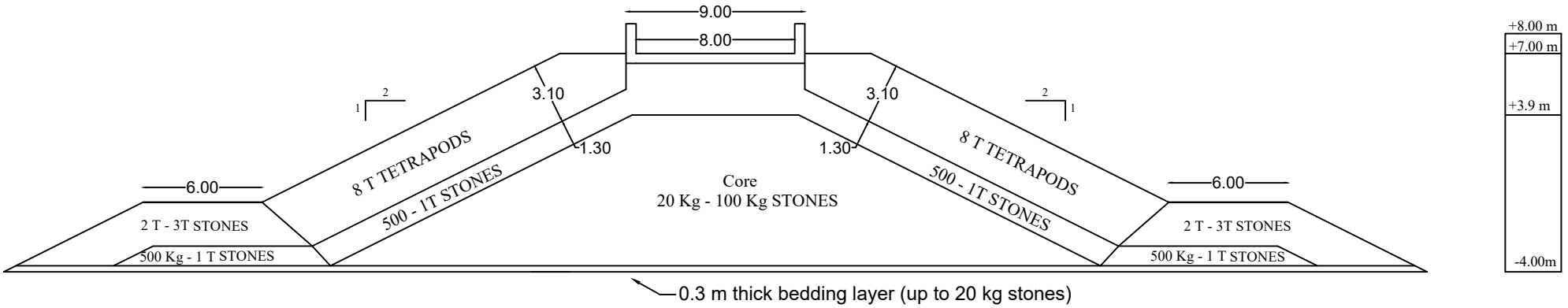
5 - 10kg Stones	16.81 sqm
20 - 100kg Stones	163.28 sqm
10 - 200kg Stones	17.42 sqm
200 - 300kg Stones	11.03 sqm
500 Kg - 1T Stones	18.89 sqm
1T - 2 T Stones	43.81 sqm
2T - 3 T Stones	28.21 sqm
6 T Tetrapods	15.31 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO:	3(d)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE:	1:250 457			
TYPE:	Break water and river training	REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -4.5 m bed level					

File No. HECE/207[illegible]
Generated from eOffice by Gouri L, AE(C5)HED, AE(C5) HED, HARBOUR ENGINEERING DEPARTMENT on 18/06/2026 06:27 PM



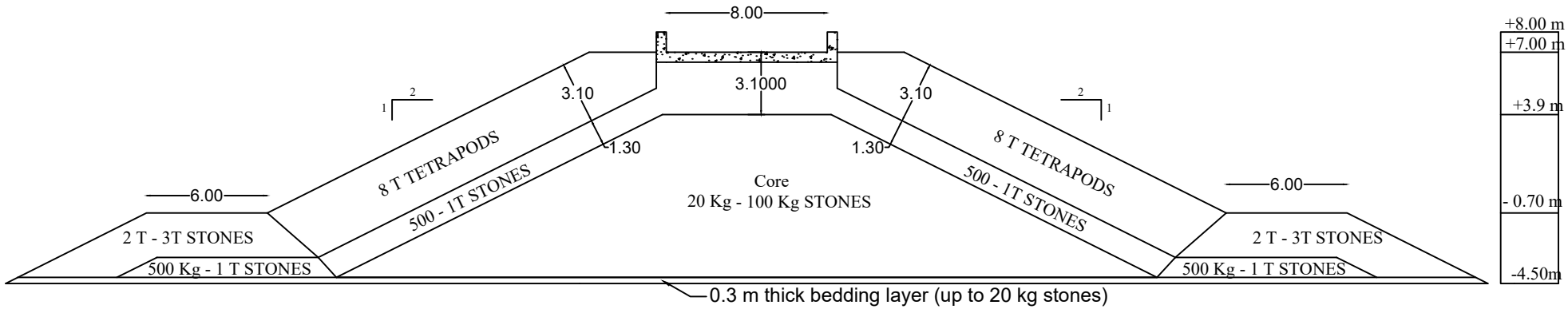
Round Head section at -4.0 m Bed Level

5 - 10kg Stones	21.32 sqm
20 - 100kg Stones	179.26 sqm
500 Kg - 1T Stones	86.99 sqm
2T - 3 T Stones	51.48 sqm
8 T Tetrapods	17.66 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO: 3(e)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:300			
TYPE:	Break water and river training	REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -4.0 m bed level	458			



Round Head section at -4.5 m Bed Level

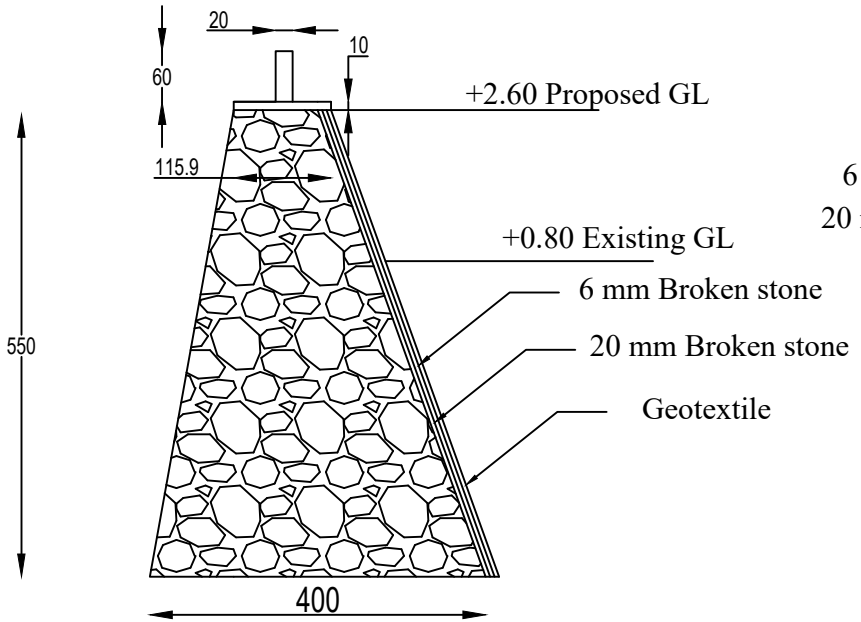
5 - 10kg Stones	21.92 sqm
20 - 100kg Stones	199.15 sqm
500 Kg - 1T Stones	89.90 sqm
2-3 T Stones	51.48 sqm
8 T Tetrapods	20.19 m

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

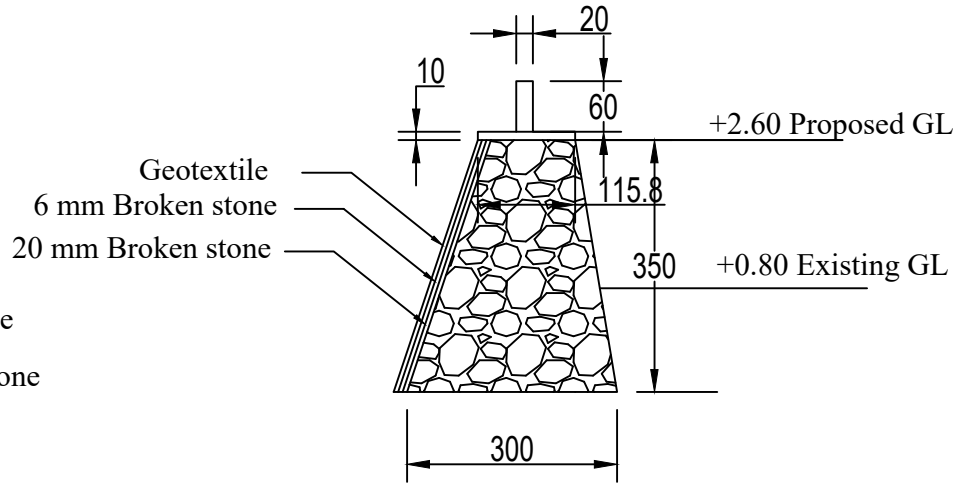
NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARGOD DISTRICT

DATE:		DWG NO: 3(f)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:300			
TYPE:	Break water and river training	REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	CHIEF ENGINEER: SIGNATURE
TITLE:	Cross section at -4.5 m bed level	459			

CROSS SECTION OF RECLAMATION BUND ALONG THE BASIN



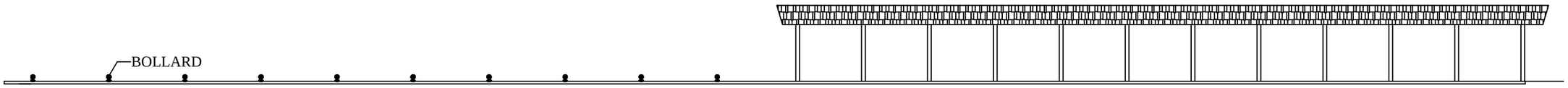
CROSS SECTION OF RECLAMATION BUND NEAR THE RIVER TRAINING AREA



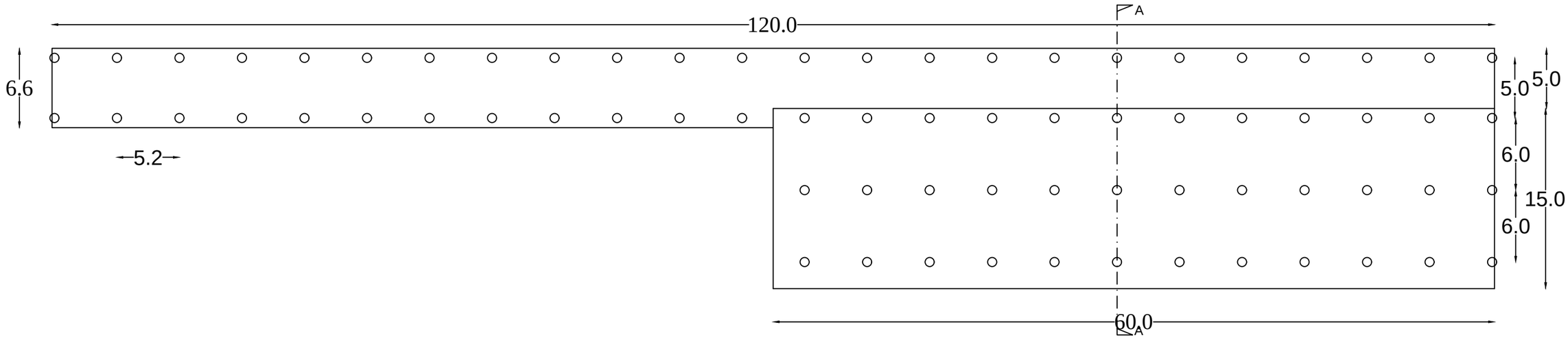
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO: 04/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:90			
TYPE:		REVISION 460	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	
TITLE:	DREDGING AND CONSTRUCTION OF RECLAMATION BUND				



FRONT ELEVATION

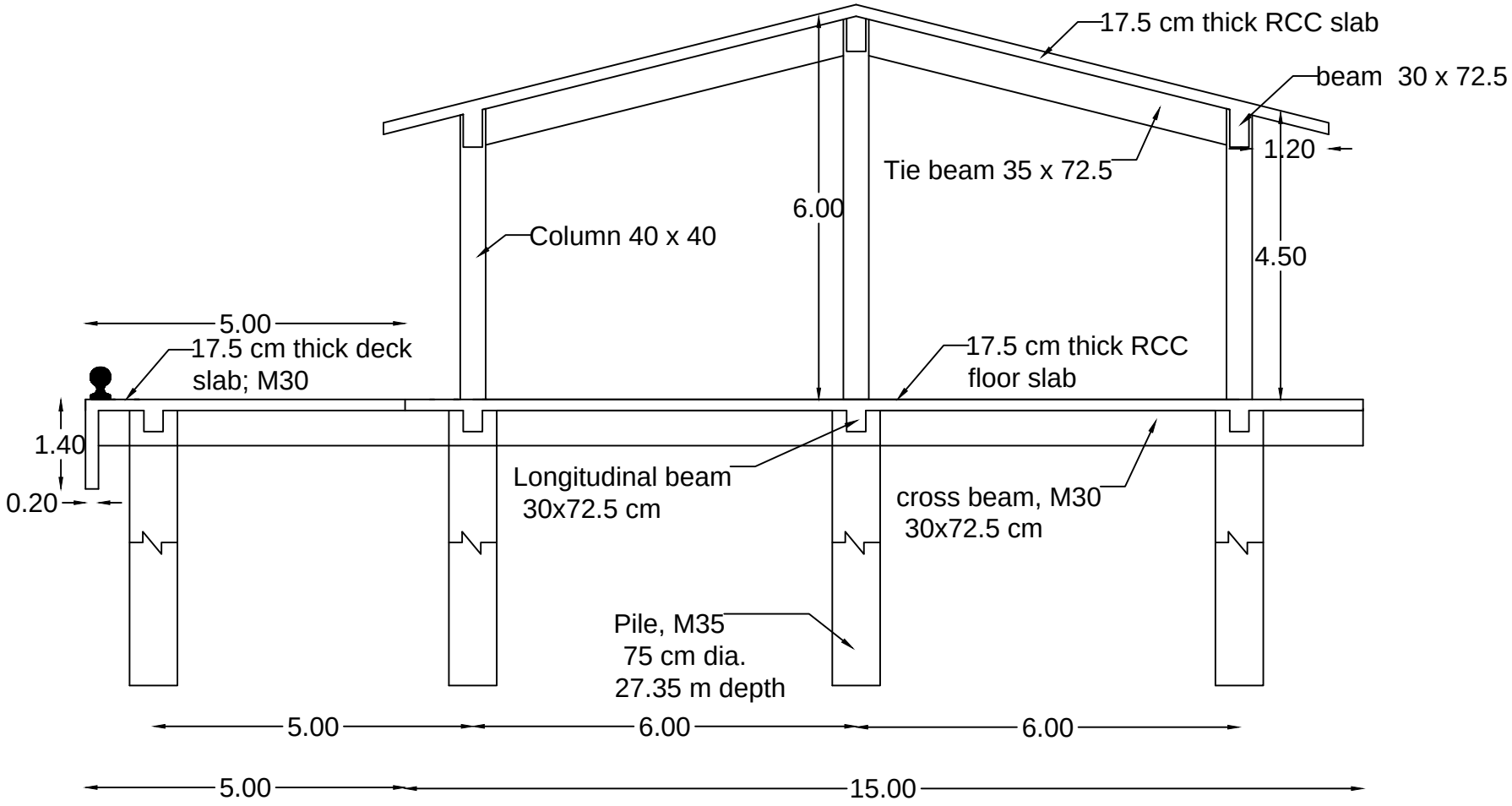


PLAN OF HARBOUR

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	5(a) /24 /AJNR					ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		DRAWN:	1:350							
TYPE:		REVISION			461			EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	
TITLE:	WHARF AND AUCTION HALL									



SECTION AA

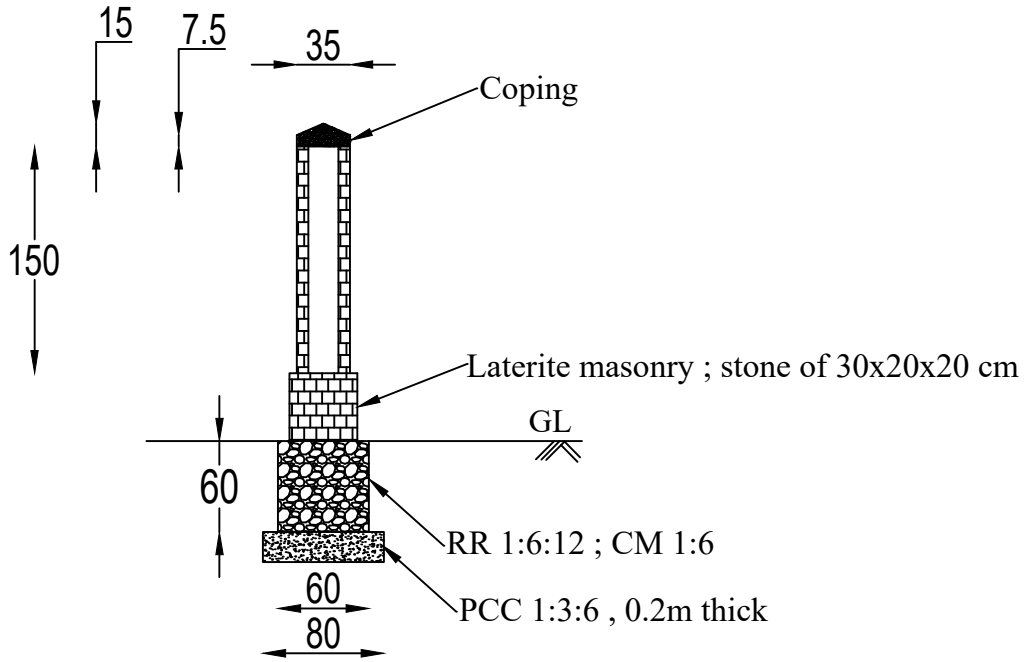
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

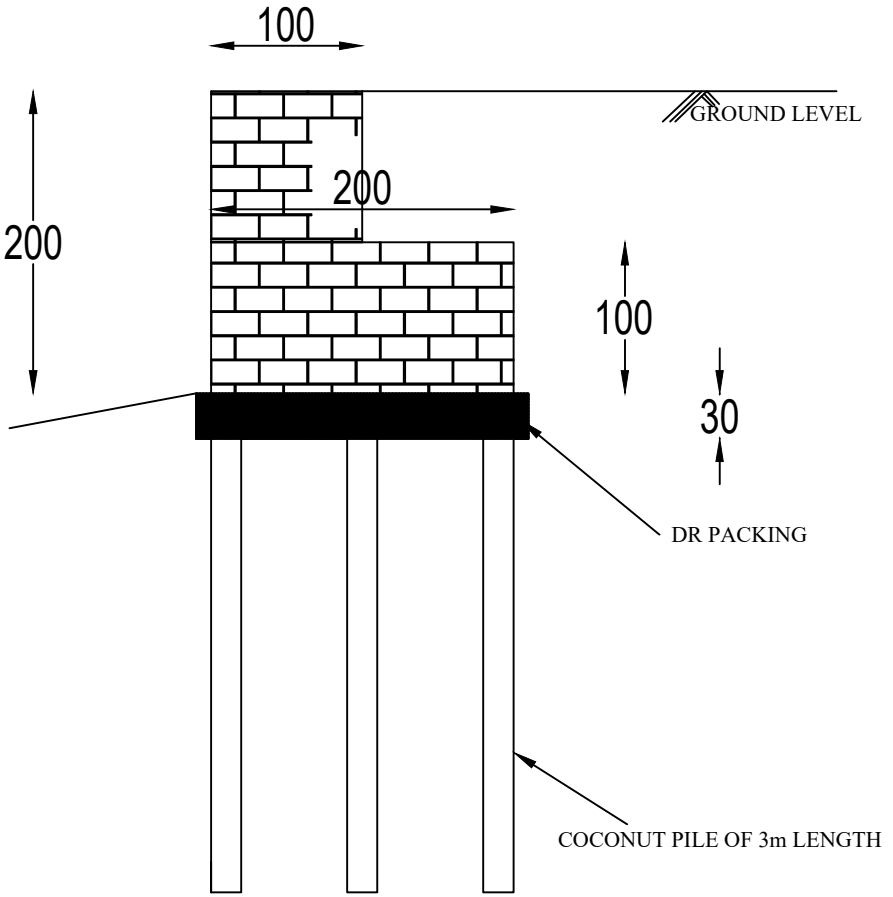
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		DRAWN: 1:100			
TYPE:		REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	
TITLE:	WHARF AND AUCTION HALL				

File No. HECE/207/2022-DR8 (Computer No. 19397)

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CROSS SECTION OF COMPOUND WALL



SIDE PROTECTION

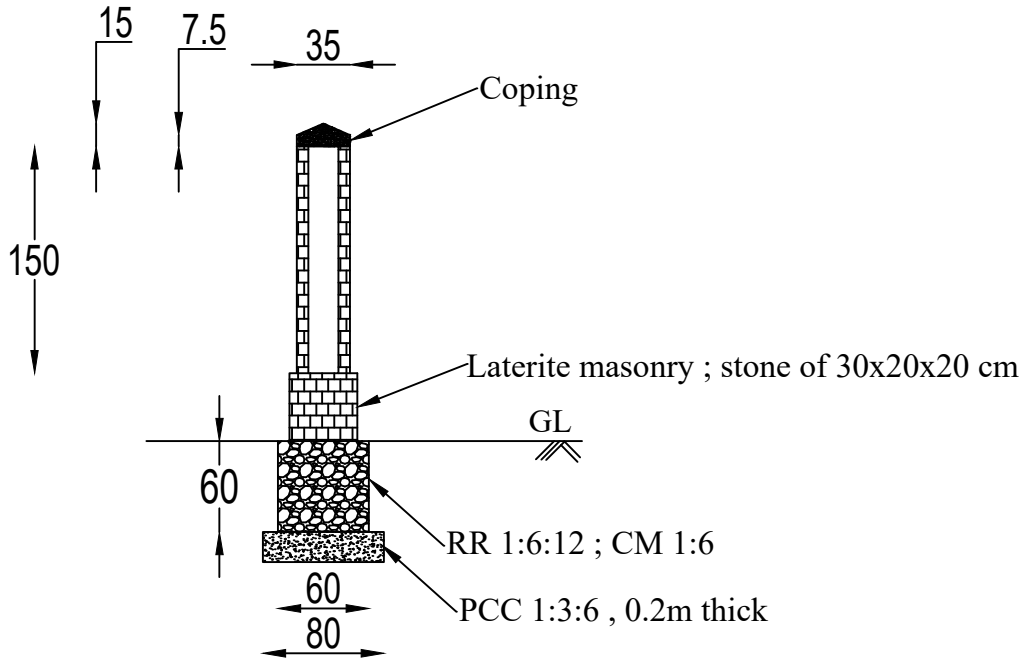
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

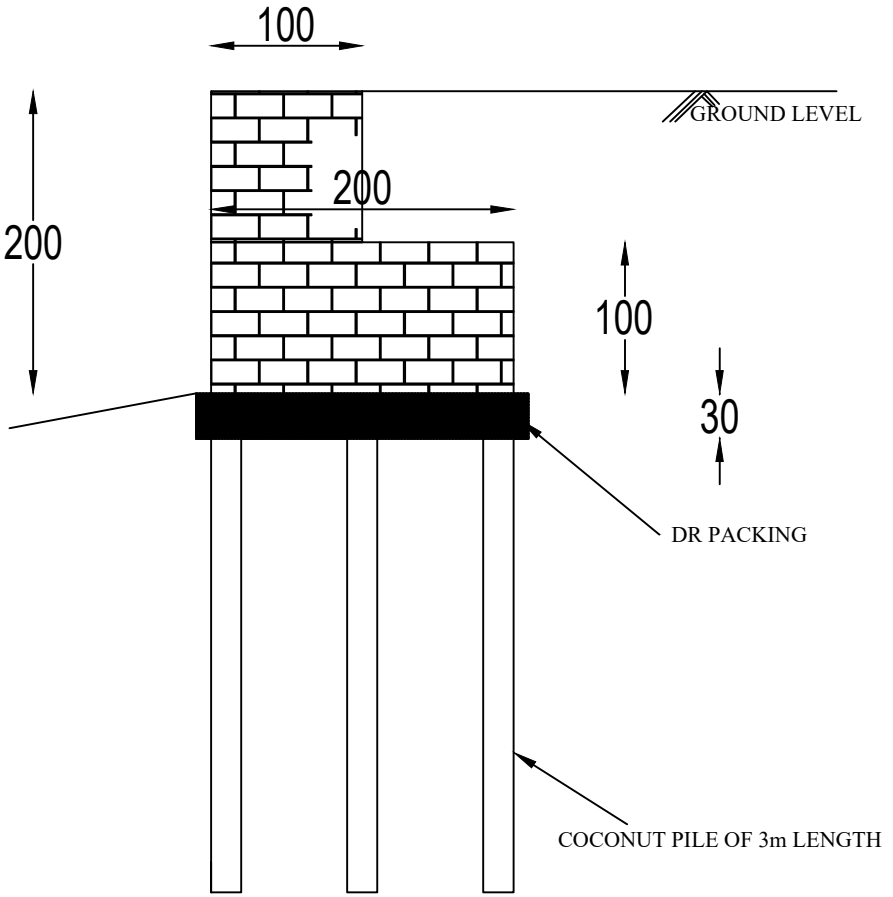
DATE:		DWG NO: 06/ 24 / AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
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TYPE:		REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	CHIEF ENGINEER: SIGNATURE
TITLE:	COMPOUND WALL AND SIDE PROTECTION				

File No. HECE/207/2022-DR8 (Computer No. 19397)

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CROSS SECTION OF COMPOUND WALL



SIDE PROTECTION

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

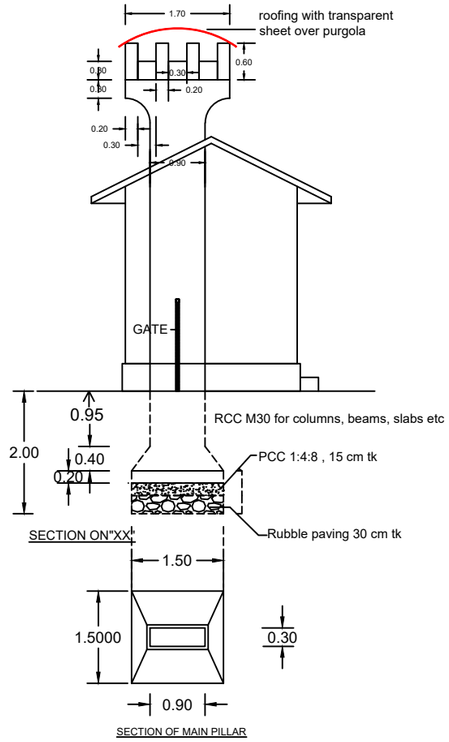
DATE:		DWG NO: 07/ 24 / AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:50			
TYPE:		REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	CHIEF ENGINEER: SIGNATURE
TITLE:	COMPOUND WALL AND SIDE PROTECTION				

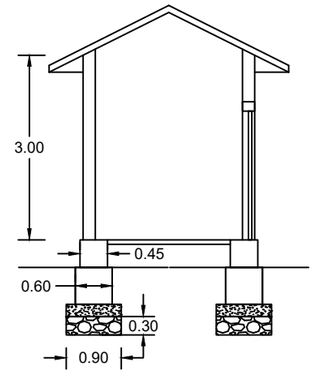
File No. HECE/207/2022-DR8 (Computer No. 19397)

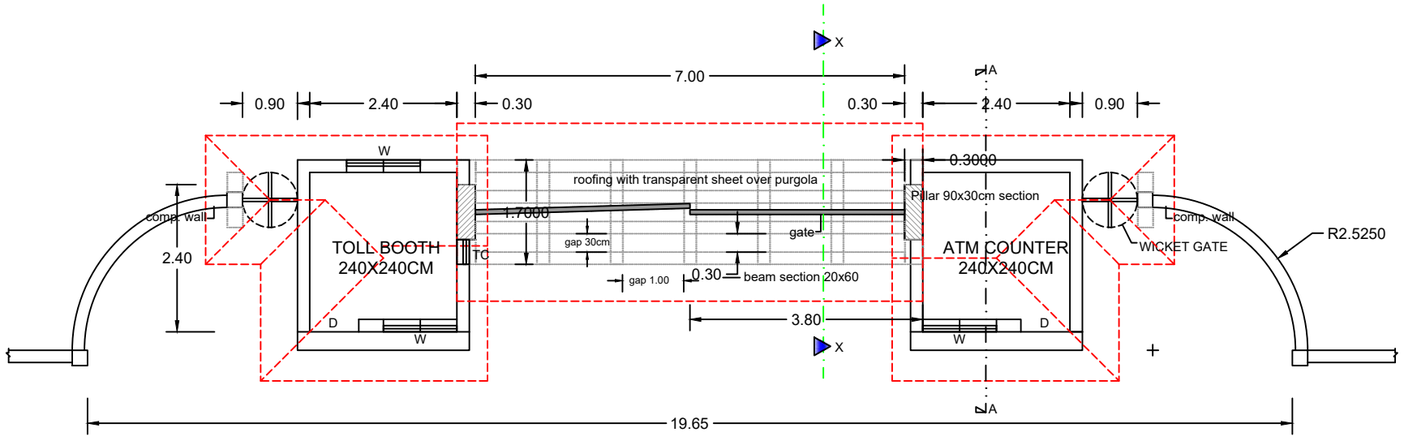
Generated from eOffice by Gouri L, AE(C5)HED, AE(C5) HED, HARBOUR ENGINEERING DEPARTMENT on 18/06/2026 06:27 PM



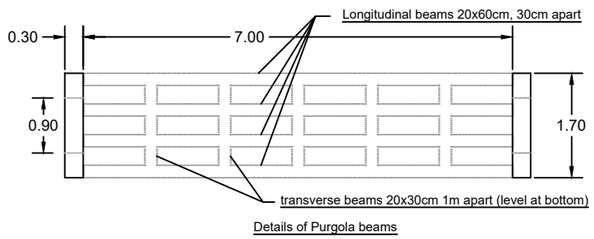
FRONT ELEVATION







PLAN OF GATE HOUSE



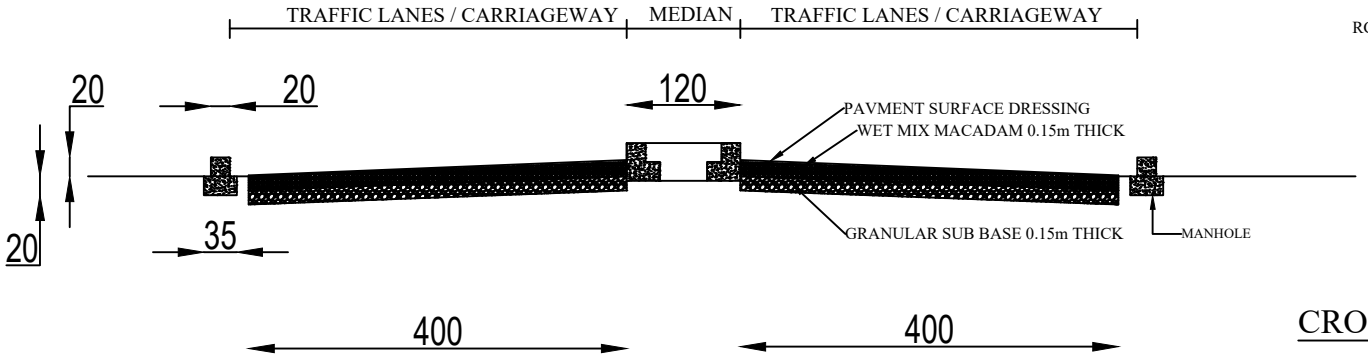
Details of Purgola beams

ALL DIMENSIONS ARE IN M

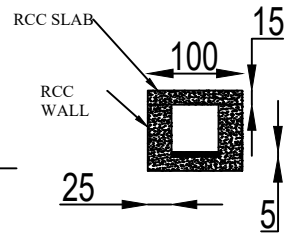
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	08 / 24 / AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:100		
TYPE:		REVISION	465	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	GATE AND GATE HOUSE				



CROSS SECTION OF ROAD

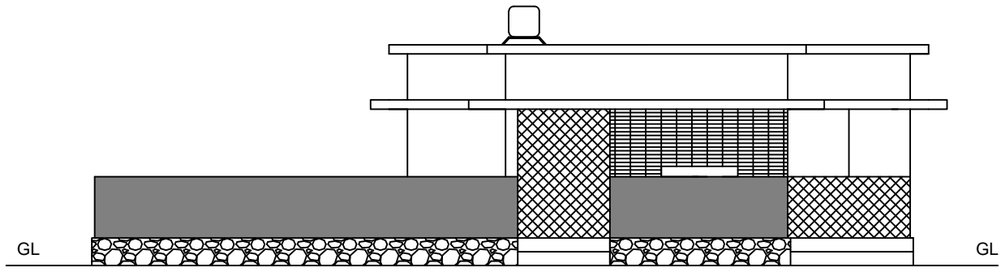


CROSS SECTION OF DRAINAGE

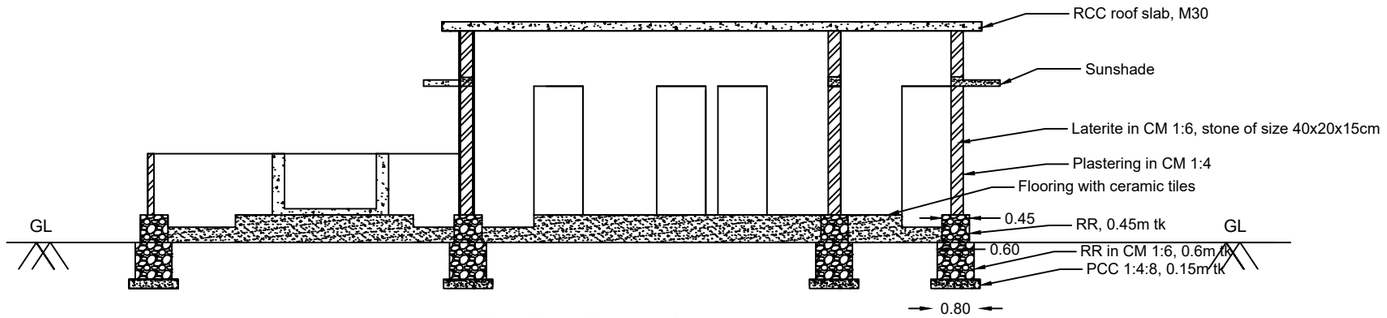
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

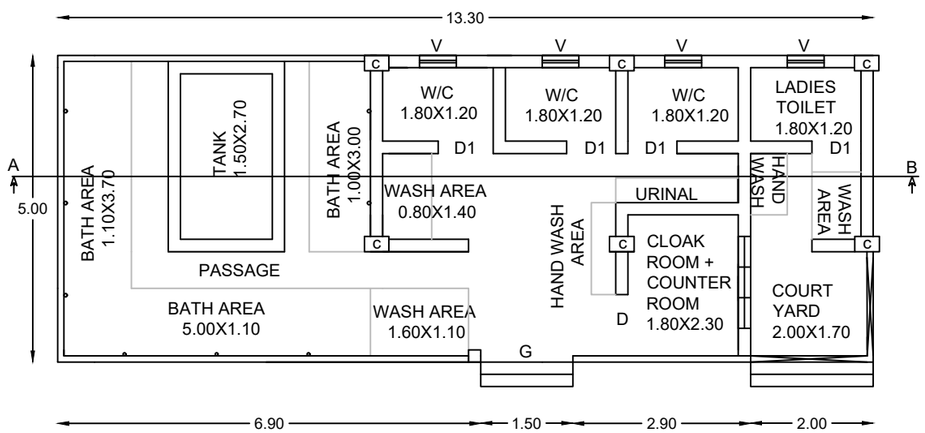
DATE:		DWG NO: 09/ 24 / AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:80			
TYPE:		REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	CHIEF ENGINEER: SIGNATURE
TITLE:	INTERNAL ROAD, PARKING AREA & DRAINAGE FACILITY	466			



ELEVATION



SECTION AB



PLAN

INDEX

DOOR	D	=1.00X2.10
DOOR	D1	= 0.80X2.10
WINDOW	W	= 1.50X1.50
VENTILATOR	V	= 0.60X0.90

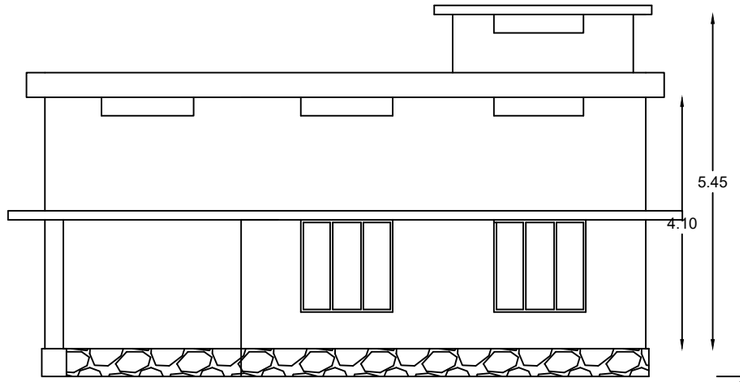
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KERALA STATE HARBOUR ENGINEERING DEPARTMENT

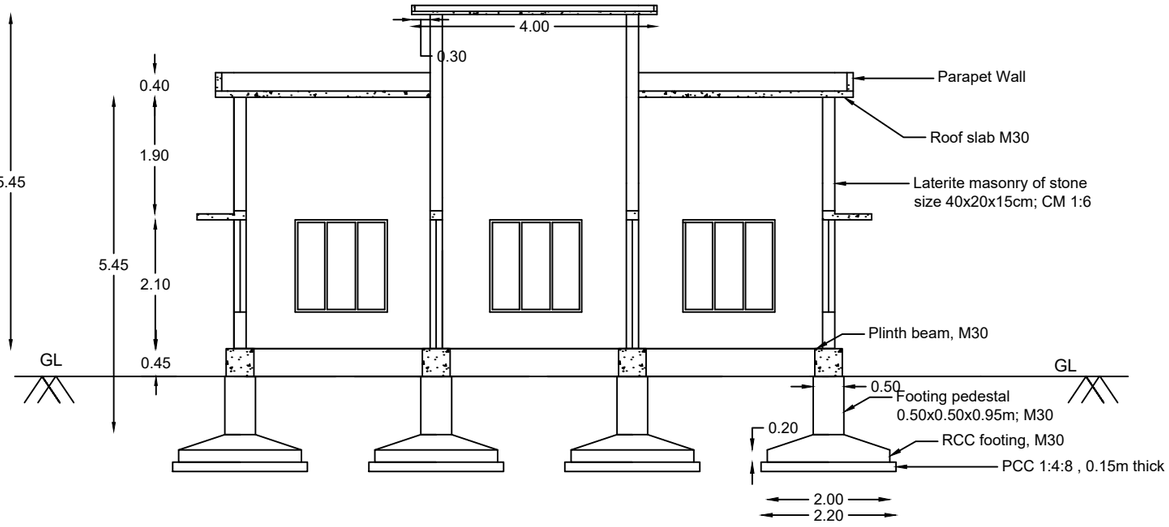
NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	10 / 24 / AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:100		
TYPE:		REVISION	467	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	TOILET BLOCK				

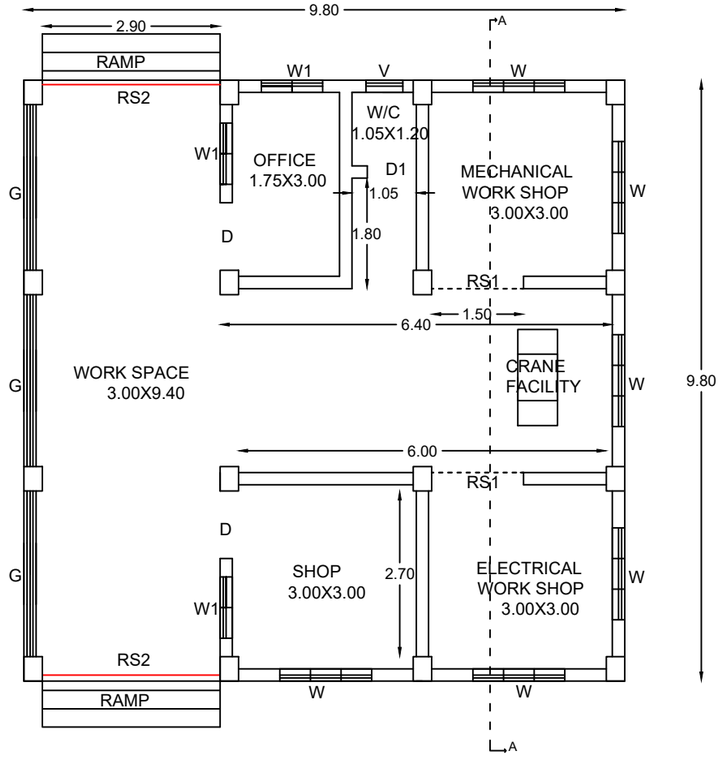
File No. HED/[illegible]
Generated from eOffice by Gouri L, AE(C5)HED, AE(C5) HED, HARBOUR ENGINEERING DEPARTMENT on 18/06/2026 06:27 PM



ELEVATION



SECTION AA



PLAN

INDEX

DOOR	D =110X210
DOOR	D1 = 80X210
GRILL	G = 280X410
VENTILATOR	V = 60X60
ROLLING SHUTTER	RS1 = 150X370
ROLLING SHUTTER	RS2 = 290X370

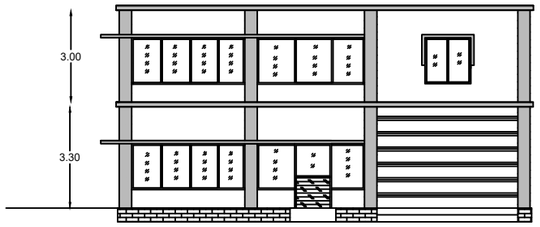
ALL DIMENSIONS ARE IN M

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

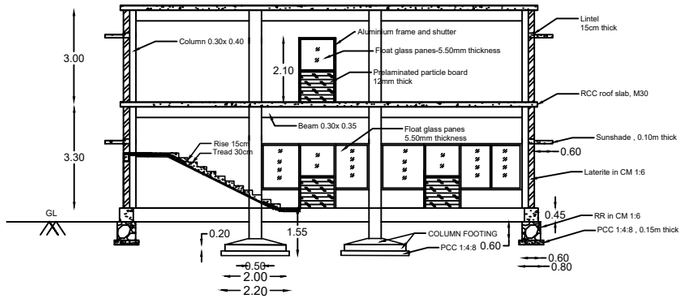
NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	11 /24 /AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:100		
TYPE:	PLAN	REVISION	468	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE / CHIEF ENGINEER: SIGNATURE
TITLE:	WORKSHOP BUILDING				

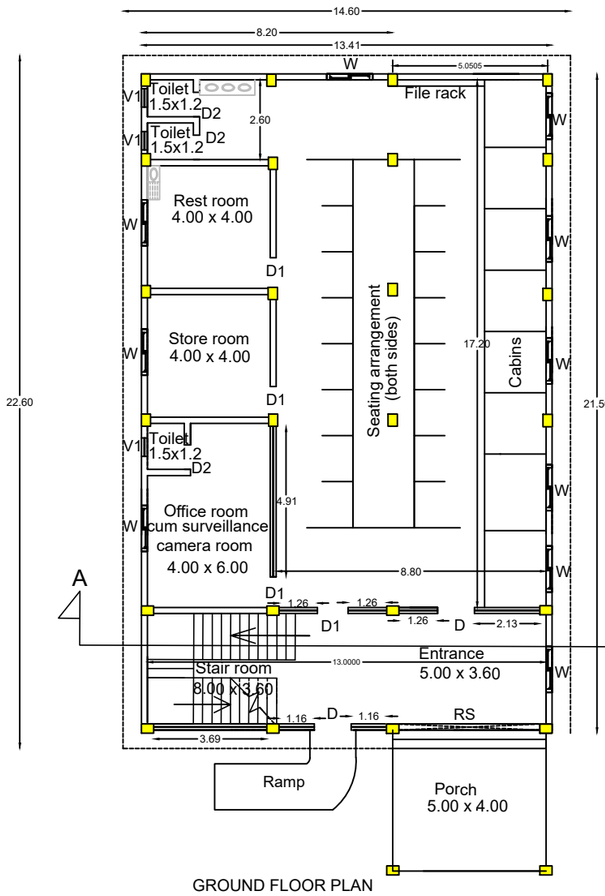
Ajanur Fishing Harbour - Construction of office room cum harbour surveillance camera room



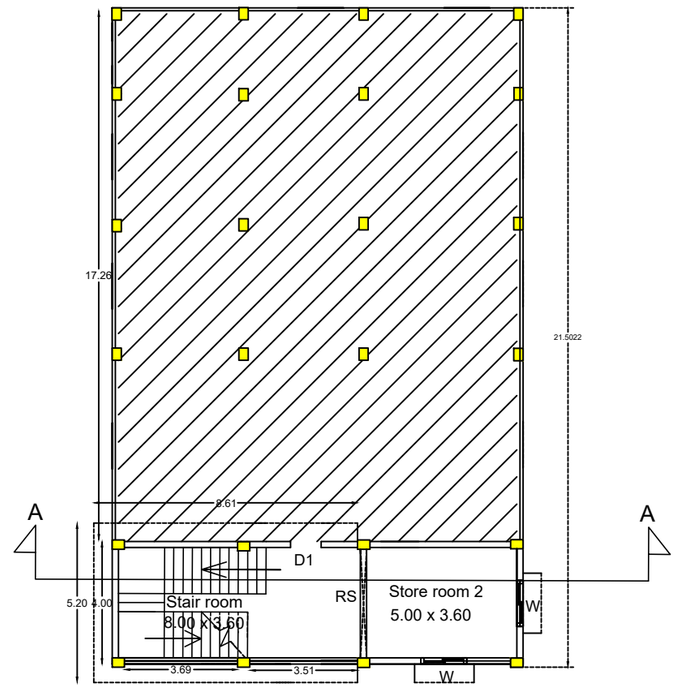
ELEVATION



SECTION A-A



GROUND FLOOR PLAN



FIRST FLOOR PLAN

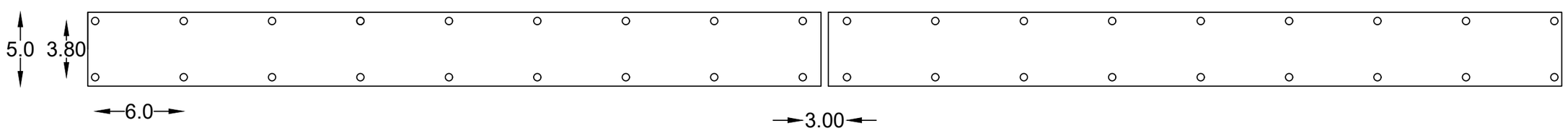
INDEX

DOOR	D	=1.20X2.10
DOOR	D1	= 1.00X2.10
WINDOW	W	= 1.50X1.50
VENTILATOR	V	= 0.60X0.60

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	12 /24 /AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:200		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	OFFICE ROOM CUM CAMERA SURVEILLANCE CAMERA ROOM		469		



BERTHING WHARF- PLAN

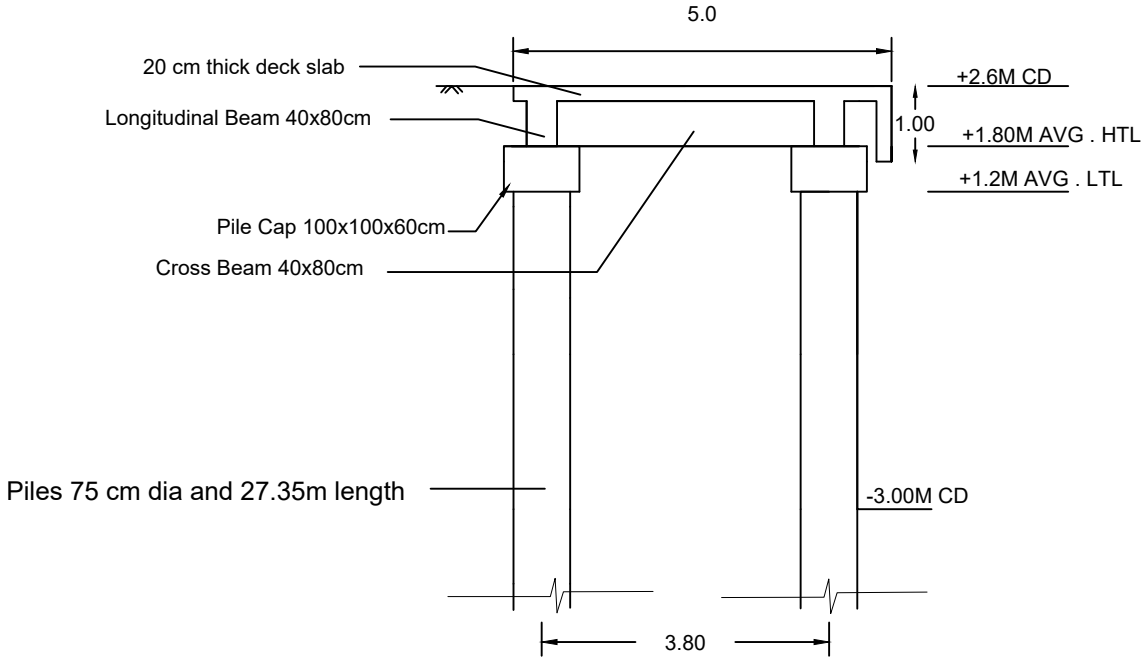
KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	13(a)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:100		
TYPE:		REVISION		EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	WHARF FOR BERTHING FACILITY				

File No. HECE/207/2022-DR8 (Computer No. 19397)

Generated from eOffice by Gouri L, AE(C5)HED, AE(C5) HED, HARBOUR ENGINEERING DEPARTMENT on 18/06/2026 06:27 PM

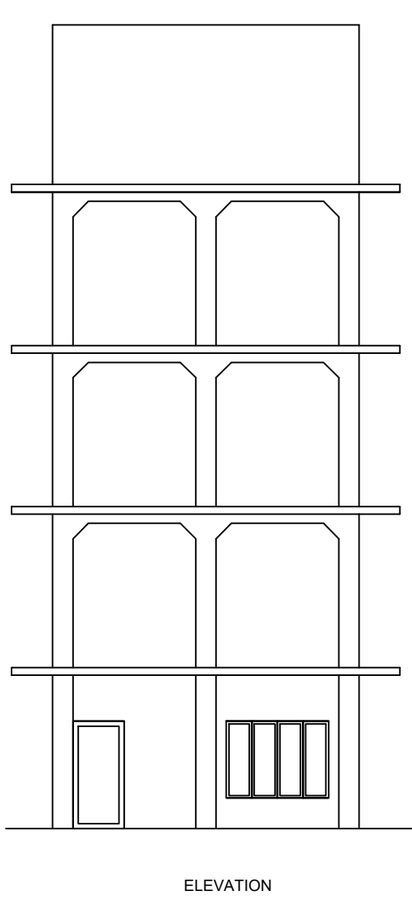


SECTION OF BERTHING WHARF

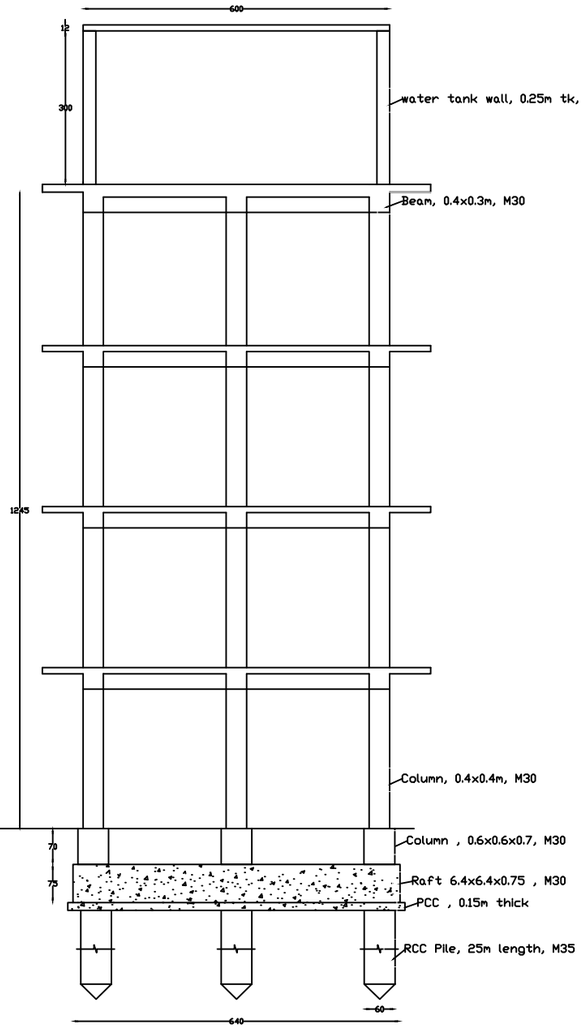
KERALA STATE HARBOUR ENGINEERING DEPARTMENT	NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT				
	DATE:	DWG NO: 13(b)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:100			
	TYPE:	REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	
	TITLE: WHARF FOR BERTHING FACILITY				

File No. HECE/207/2022-DR8 (Computer No. 19397)

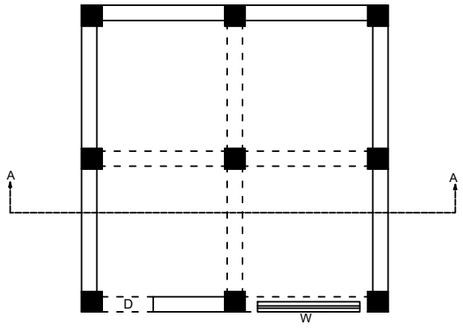
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ELEVATION



SECTION AA



PLAN

DOOR	100X210mm
WINDOW	200X150mm
AREA:-	36.00sqm

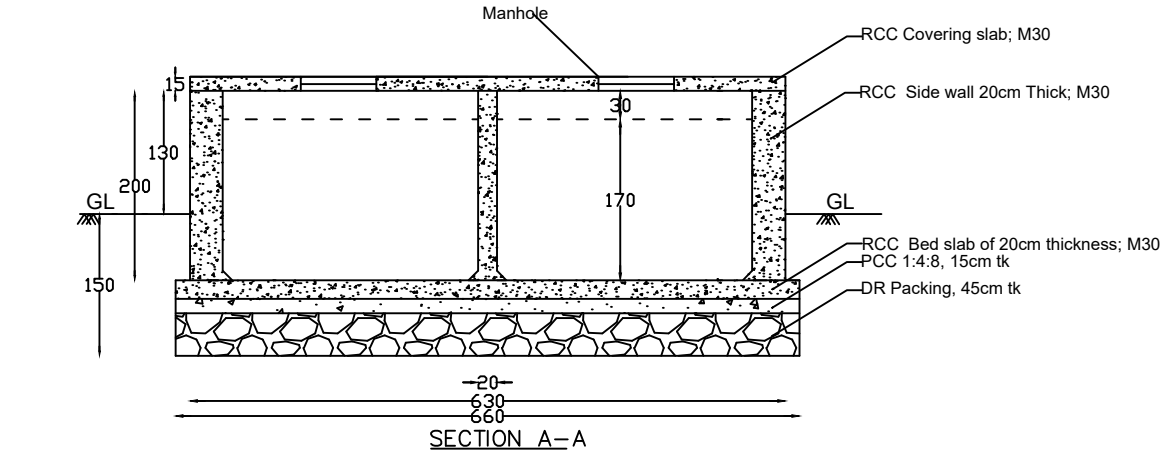
ALL DIMENSIONS ARE IN CM

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

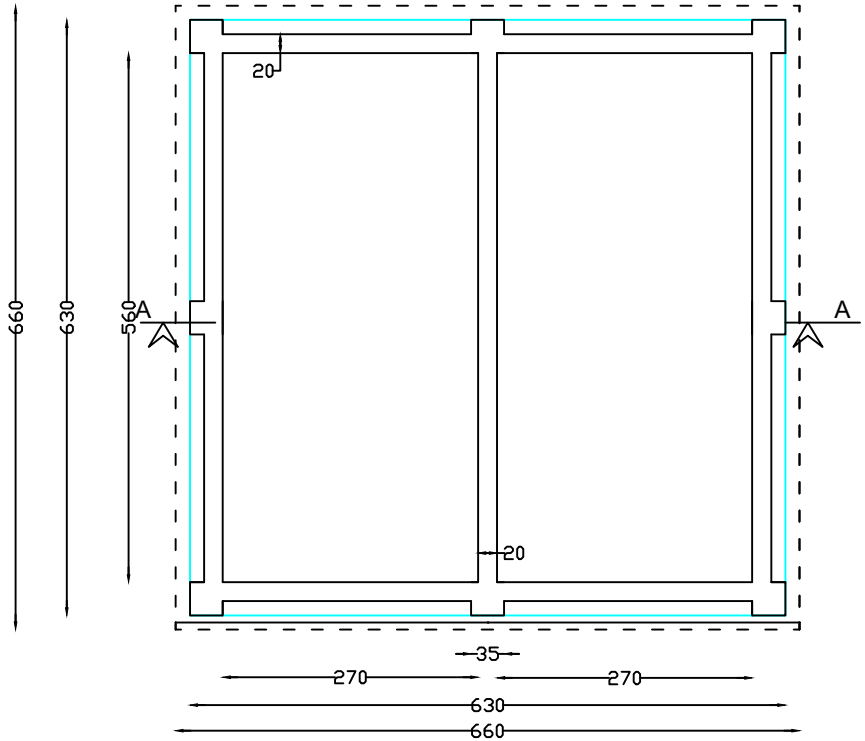
NAME OF THE PROJECT: PMMSY - CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO:	14(a) / 24 / AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE
		SCALE:	1:120		
TYPE:		REVISION	472	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE
TITLE:	OH TANK				

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SECTION A–A



PLAN SUMP

KERALA STATE HARBOUR ENGINEERING DEPARTMENT

NAME OF THE PROJECT: PMMSY-CONSTRUCTION OF AJANUR FISHING HARBOUR IN KASARAGOD DISTRICT

DATE:		DWG NO: 14 (b)/24/AJNR	ASSISTANT ENGINEER: SIGNATURE	ASSISTANT EXECUTIVE ENGINEER: SIGNATURE	
		SCALE: 1:80			
TYPE:		REVISION	EXECUTIVE ENGINEER: SIGNATURE	SUPERINTENDING ENGINEER: SIGNATURE	
TITLE:	WATER SUPPLY ARRANGEMENTS- SUMP	473			

GOVERNMENT OF KERALA

Fisheries & Ports (B) Department

No.B2/228/2024/FandP 15-10-2025,Thiruvananthapuram

From

Special Secretary to Government

To

The Director of Fisheries,
Thiruvananthapuram

The Chief Engineer
Harbour Engineering Department,Thiruvananthapuram.

Sir,

Sub: Fisheries Department - Proposal for construction of Fishing Harbour at Ajanur, Kasargod, under PMMSY - Reg.

Ref: 1. Letter No. F.No.j-24001/6/2025-Fy from Government Of India. (copy enclosed)
2. Letter No.DFTVM/229/2022-K3 dated 07-11-2024 from the Director of Fisheries.
3. Letter No.HECE/517/2021-DR8 dated 17-10-2024 from the Chief Engineer, Harbour Engineering Department.

I am to invite your attention to the references cited and to forward herewith a copy of the letter at reference 1st cited for further necessary action.

Yours Faithfully,
ASBINA A V
UNDER SECRETARY
For Special Secretary to Government.

Approved for Issue,

File No. HECE/207/2022-DR8 (Computer No. 19397)

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Section Officer.

File No. HECE/207/2022-DR8 (Computer No. 19397)

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15 JUL 2025

F. No. j-24001/6/2025-Fy
Government of India
Ministry of Fisheries, Animal Husbandry and Dairying
Department of Fisheries
***

Chanderlok Building, New Delhi
Dated the 8th July, 2025

To
The Principal Secretary
Government of Kerala
Department of Fisheries, Ports & Harbour Development
Thiruvananthapuram
(Email: prlsec.fisheries@kerala.gov.in)

Subject: Construction of Fishing Harbour at Ajanur, Kasargod , Kerala under PMMSY.

Sir,

I am directed to refer to letter No. B1/312/2024-F&PD dated 24-01-2025 on the subject noted above and to say that the proposal of Construction of Fishing Harbour at Ajanur, Kasargod, Kerala under PMMSY has been examined in consultation with Central Institute of Coastal Engineering for Fishery(CICEF), Bangalore and concluded that the cited project is economically not viable due to the following factors:-

(i) Proximity to existing fishing harbours-Kasargod and Cheruvattur are only 17 KM away;

(ii) High Construction costs- Breakwaters, training walls and dredging constitutes a significant amount;

(iii) Additional Costs involved in the environmental mitigation measures;

(iv) Limited number of mechanized fishing vessels-Only a small fleet operates in the proposed site area

2. It is, therefore, requested to kindly submit techno-financial viable proposals under the ongoing schemes of this Ministry for holistic development of fishers and fisheries sector in the region so as to enable to examine the matter further.

Yours faithfully,

(G. Ramakrishna Rao)
Assistant Commissioner (Fisheries)
Tel: 011-23310351

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Office of the Chief Engineer
Harbour Engineering Department, Kamaleswaram
Manacaud P.O., Thiruvananthapuram - 695 009
Telephone/Fax: 0471-2459365/2459159
Website: www.hed.kerala.gov.in
E-mail: ce.hed@kerala.gov.in

No. HECE/207/2022-DR8 Dated: 17-11-2025

From

The Chief Engineer

To

The Special Secretary
Fisheries & Ports (B) Department
Thiruvananthapuram

Sir,

Sub: Harbour Engineering Department - Proposal for construction of Fishing Harbour at Ajanur, Kasargod, under PMMSY - Reg

Ref: 1. Government letter No.B2/228/2024/FandP dated 15-10-2025
2. This office letter no. HECE/517/2021-DR8 dated 17.10.2024

Kind attention is invited to the references cited. The detailed project report for the construction of Ajanur Fishing Harbour in Kasaragod district amounting to Rs. 200 crore has been prepared based on the model study report of CWPRS and submitted to the Government vide reference (2). Following the approval of the State Level Approval And Monitoring Committee Meeting (SLAMC) held on 15.01.2025, the State Government submitted the project report for approval to the Central Government on 24/01/2025.

Subsequently, vide reference (1) cited, it was informed that the Central Government, in consultation with the Central Institute of Coastal Engineering for Fisheries (CICEF), Bangalore, has concluded that the proposed project is economically not viable. In this context the following observations are furnished herewith for your information and further necessary action.

(i) Proximity to existing harbours Kasaragod & Cheruvathur

- Both Kasaragod and Cheruvathur harbours are already operating at near full capacity with congestion during peak fishing seasons.
- The Ajanur–Chithari sector covers around 7,000 fisherfolk from Hosdurg, Ajanur, and Pallikkara villages, 2,138 registered fishermen and about 600 registered fishing crafts, who currently operate without safe berthing facilities.
- The migratory nature of Chithari river mouth creates unstable and unsafe landing conditions .
- Travelling other harbours is impractical for artisanal fishermen using small boats,

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especially during rough sea conditions.

- Establishing Ajanur Harbour provides balanced coastal infrastructure distribution across Kasargod's 70 km coastline.

(ii) High construction costs (breakwaters, training walls, dredging)

- Breakwaters are a critical component of fishing harbour infrastructure, designed to protect harbour basins from wave energy, ensuring safe mooring and smooth fishing operations. Kerala's coastline has recently experienced a rise in extreme weather events. Cyclones *Ockhi* (2017), *Gaja* (2018), and *Tauktae* (2021) brought unprecedented storm surges and wave heights, exceeding design limits of many breakwaters. The proposed breakwater section is based on the Flume study conducted by CWPRS Pune considering the above factors.
- The capital dredging quantity in the proposal is calculated based on the soundings. Moreover in the Mathematical model study conducted by CWPRS, it is concluded that the capital dredging in the fishing harbour area, in the river mouth and along the river is calculated to be about 1.1 Mm^3.

(iii) Additional costs for environmental mitigation

- In the mathematical model study report submitted by CWPRS, it was recommended to provide suitable shore protection measures on the south side of fishing harbour if necessary, after monitoring the shore line behaviour due to the construction of breakwaters. Hence, mitigation costs are not included in the present proposal.
- Stabilizing the Chithari estuary will reduce annual artificial dredging and erosion-related interventions, offering long-term environmental savings as the project aims to natural stabilization of river–sea interface, aligning with sustainable coastal management principles.

(iv) Limited number of mechanized fishing vessels

- The project primarily serves artisanal and motorized fishermen (≈600 boats) who currently lack basic infrastructure, ice storage, or hygienic landing areas.
- Mechanized vessels are fewer, but the artisanal catch volume is substantial. With safe berthing and cold-chain facilities, fishermen are likely to upgrade to semi-mechanized craft, increasing output and employment.
- Cost-Benefit ratio of 1.37 further confirms economic viability of the proposed project.

In view of the above, considering the urgency and importance of the said project to the State, it is hereby requested that necessary actions be taken to consider this project under FIDF scheme and obtain approval for the same. The above information is submitted for your information and further necessary action.

Yours faithfully,

Encl : Ref (2)

Signed by Lotus V K
Date: 17-11-2025 13:35:41

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Chief Engineer (I/C)

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15 JUL 2025

F. No. j-24001/6/2025-Fy
Government of India
Ministry of Fisheries, Animal Husbandry and Dairying
Department of Fisheries
***

Chanderlok Building, New Delhi
Dated the 8th July, 2025

To
The Principal Secretary
Government of Kerala
Department of Fisheries, Ports & Harbour Development
Thiruvananthapuram
(Email: prlsec.fisheries@kerala.gov.in)

Subject: Construction of Fishing Harbour at Ajanur, Kasargod , Kerala under PMMSY.

Sir,

I am directed to refer to letter No. B1/312/2024-F&PD dated 24-01-2025 on the subject noted above and to say that the proposal of Construction of Fishing Harbour at Ajanur, Kasargod, Kerala under PMMSY has been examined in consultation with Central Institute of Coastal Engineering for Fishery(CICEF), Bangalore and concluded that the cited project is economically not viable due to the following factors:-

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(iii) Additional Costs involved in the environmental mitigation measures;

(iv) Limited number of mechanized fishing vessels-Only a small fleet operates in the proposed site area

2. It is, therefore, requested to kindly submit techno-financial viable proposals under the ongoing schemes of this Ministry for holistic development of fishers and fisheries sector in the region so as to enable to examine the matter further.

Yours faithfully,

(G. Ramakrishna Rao)
Assistant Commissioner (Fisheries)
Tel: 011-23310351

GOVERNMENT OF KERALA

Fisheries & Ports (B) Department

No.B2/228/2024/FandP 01-12-2025,Thiruvananthapuram

From
Special Secretary to Government

To
The Director of Fisheries,
Thiruvananthapuram

Sir,

Sub: Fisheries Department - Proposal for construction of Fishing Harbour at Ajanur, Kasargod, under PMMSY - Reg.

Ref: 1. Letter No. HECE/207/2022-DR8 dated 17.11.2025 from the Chief Engineer, Harbour Engineering Department.
2. Government letter of even no. dated.15.10.2025.

I am to forward herewith the copy of the reference cited for furnishing urgent report.

Yours Faithfully,
ASBINA A V
UNDER SECRETARY
For Special Secretary to Government.

Approved for Issue,

Signed by Biju. K
Date: 01-12-2025 11:39:16

Section Officer.