FIFTEENTH KERALA LEGISLATIVE ASSEMBLY

COMMITTEE
ON
PUBLIC UNDERTAKINGS
(2023-2026)

FORTY FOURTH REPORT

(Presented on 11th February, 2025)

SECRETARIAT OF THE KERALA LEGISLATURE
THIRUVANANTHAPURAM
2025

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ON
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On

The action taken by Government on the Recommendations contained in the Fifty Sixth Report of the Committee on Public Undertakings (2016-2019) relating to Kerala Water Authority, based on the Report of the Comptroller and Auditor General of India for the year ended on 31st March 2011, 2013, 2014

485/2025.

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COMMITTEE ON PUBLIC UNDERTAKINGS

(2023-2026)

COMPOSITION

Chairperson:

Shri E. Chandrasekharan.

Members:

Shri A. P. Anil Kumar

Shri Anwar Sadath

Shri Ahammad Devarkovil*

Shri T. V. Ibrahim

Shri P. Mammikutty

Shri K. P. Mohanan

Shri D. K. Murali

Shri P. Nandakumar

Shri Kadakampally Surendran

Shri P. Ubaidulla.

Legislature Secretariat:

Dr. N. Krishna Kumar, Secretary

Shri Venugopal R., Joint Secretary

Shri Anil Kumar B., Deputy Secretary

Shri Mohanan O., Under Secretary.

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*In the vacancy of Shri K. B. Ganesh Kumar sworn in as Transport Minister w.e.f. 16-1-2024.

INTRODUCTION

I, the Chairperson, Committee on Public Undertakings (2023-2026) having been authorised by the Committee to present the Report on their behalf, present this Forty fourth Report on the Action Taken by the Government on the Recommendations contained in the Fifty Sixth Report of the Committee on Public Undertakings (2016-2019) relating to Kerala Water Authority, based on the Report of the Comptroller and Auditor General of India for the year ended 31st March, 2011, 2013, 2014.

The Statement of Action Taken by the Government included in this Report was considered by the Committee in its meetings held on 16-9-2021 and 26-10-2022.

This Report was considered and approved by the Committee in the meeting held on 4-12-2024.

The Committee place on record their appreciation for the assistance rendered to them by the Accountant General (Audit), Kerala, officials of Water Resources Department and Kerala Water Authority who were present during the examination of the Action Taken Statements included in this Report.

E. CHANDRASEKHARAN,
Chairperson,
Committee on Public Undertakings.

Thiruvananthapuram,
11th February 2025.

REPORT

This Report deals with the Action Taken by Government on the recommendations contained in the 56th Report of the Committee on Public Undertakings (2016-2019) relating to Kerala Water Authority based on the Report of the Comptroller and Auditor General of India for the year ended 31st March 2011, 2013 and 2014.

The Fifty Sixth Report of the Committee on Public Undertakings (2016-2019) was presented in the House on 24th January 2018. The Report contained Nineteen recommendations and the Government furnished replies to all these recommendations.

The Committee examined the statement of Action Taken received from the Government on 16-9-2021 and 26-10-2022. The Committee accepted the reply on recommendation in Para No. 33 and sought additional information on Para Nos. 32, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49 and 50 in the meeting held on 16-9-2021. After considering the additional information the Committee accepted the replies on Para 32, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47 and 50 without remarks in the meeting held on 26-10-2022. These recommendations, additional information sought by the Committee and the replies furnished by the Government form Chapter I of this Report.

The replies of additional information received on Paras 48 and 49 are accepted by the Committee with remarks in the meeting held on 26-10-2022 which form Chapter II of this report.

CHAPTER – I

REPLIES FURNISHED BY THE GOVERNMENT ON THE RECOMMENDATIONS OF THE COMMITTEE WHICH HAVE BEEN ACCEPTED BY THE COMMITTEE WITHOUT REMARKS

Sl. No.	Para No.	Department Concerned	Conclusions/ Recommendations	Action Taken by the Government
1	32	Water Resources	The committee vehemently criticized KWA for inordinate delay in the completion of Water Supply Schemes rendering them thoroughly ineffective. The Committee strongly recommends to take drastic measures to complete the ongoing projects and ensure water connection to consumers without delay.	KWA finalizes proposal for water supply projects based on the requirements and resolutions from local bodies for the handing over of required land. Accordingly, KWA prepares project reports with detailed implementation schedule. The implementation of all the projects is based on the schedule. But in some cases the projects are delayed mainly due to the following reasons. • The local bodies do not hand over the required locations in time. The local bodies initially agree or pass resolution that the land will be handed over by them for the project. But after getting sanction for the project, the earlier stand taken by LSGD is not adhered to in some cases. • Delay in getting permission for road cutting and rail crossing

				• Public protest in some areas • Tender processing delays due to insufficient delegation of powers • Reduction in fund availability etc. KWA has taken specific measures to overcome these impediments • Action has been taken to resolve the above issues based on reviews at various levels and delegation has also been enhanced. • Tender for the works will be invited only after getting the land in possession • Projects Divisions have been formed exclusively for implementation of major projects. • At present the implementation of NRDWP projects is upset due to the reduction in central allocation. In this regard KWA has already restructured the implementation of the projects taken up under NRDWP. Accordingly implementation of 55 Non-started NRDWP projects has been stopped for considering those projects under other heads. No new projects under NRDWP have been sanctioned and priority has been given to those projects which can be completed investing minimum amount.

				• State Government has provided an additional allocation of Rs. 100 Crore for the completion of ongoing NRDWP projects. • KWA has finalised Annual work Plan for the year 2018-19 wherein specific target have been fixed for water connection, revenue collection in addition along with other targets relating to projects implementation and maintenance. • Exclusive Monitoring wing has been set up at Head Office level for regular monitoring of projects implementation. The issues in connection with implementation is taken up at various levels to sort out the same.
			Additional information sought on Para32 The Committee wants to know the present status of the measures taken to complete the ongoing projects and ensure water connection to consumers without delay.	**Measures taken to complete the ongoing projects without delay :** 1 In order to ensure timely completion of projects, Project Divisions are established w.e.f. 2009 at District level for exclusive monitoring of the ongoing projects. 2 Project Implementation Units are established at KWA HQ level for the

					consolidated monitoring of Projects under various Schemes at State level.
				3	The Projects are monitored using the "PASK" (Project Alert System in KWA) software in which the progress, both physical and financial, of projects are made available in the Public domain. The field officers can register the progress and issues, if any, which can be brought to the notice of higher levels and resolved at the earliest. The Reviews at various levels are conducted periodically based on the information uploaded in PASK.
				4	Delay in the permission for road cutting: The ROW (Right of Way) Portal of PWD is available in which the request for road cutting sanctions can be registered. The Portal hosted by IT mission is aimed at resolving the road cutting sanction issues at the earliest.
				5	The Railway sanctions are resolved at HQ level meetings with the Divisional Authorities of Railways. Further, such

				requests are also registered in the recently constituted e-PMG Portal, patronized by the State and Central Governments which enables eatly resolution of all such issues. Thus, earnest actions have been taken to avoid delay.
2.	33	Water Resources	The committee observes that violating statutory provision of the KVAT 2003, the Water Authority irregularly refunded works contract tax amounting to 50.95 Lakh to contractor in 2007 and the amount had not been recovered so far. The committee exhorts to probe into the matter and take immediate steps to recover the excess amount from the contractor.	The amount of ₹ 50.95 lakhs has been completely recovered vide CBV 21 of 12/2017 from CC 31" and part bill of M/s. Kerala Construction Corporation towards irregular refund of work contract tax related to the work "WS Augmentation to Parur Municipality and adjoining panchayath Improvements to Chowara Headworks and laying Pumping main from Chowara to Parur sump.
3	34	Water Resources	The Committee observes that the power factor penalty amounting ₹ 4.35 Crore was imposed on	Vide Circular No. KWA/JB/EW/C&QAG/ REP/ 349/11 dated, 1-9-2014 directions were issued to avoid power factor penalty by installing static

			Water Authority by KSEB in 2011 due to failure in installing Static Capacitors in the pumping station of Kerala Water Authority. The Committee wants to know the present status of installation of static capacitors in Kerala Water Authority.	capacitors as needed immediately. Accordingly action has been taken by field officers for the installation of static capacitors. On verification of electrical bills of HT connections of Kerala Water Authority for the year 2017, it is noted that the power factor penalty is reduced to 1.347 crore from that of ₹ 4.35 crore in 2011. Moreover installation of static capacitors have enabled KWA to enjoy the benefits of power Factor incentive to the tone of ₹ 2.37 Crores.
			Additional Information sought on Para 34 The committee wants to know the present status of installation of static capacitors in Kerala Water Authority	At present all the pumping stations are equipped with Static Capacitors of suitable value. Meanwhile, KSEBL revised power factor (PF) value from 0.90 to 0.95 as per the Order No. 560/DD(T)2018/KSERC dated 8-7.-2019. Due to this revision, some installed capacitors were not having sufficient value to the required bench mark. However, as per KSEBL High Tension (HT) connection bills for the period from January 2021 to November 2021, the penalty has been considerably reduced. The net penalty on an average works out to ₹ 1.01 crore per annum as

				against ₹ 4.35 crore reported earlier. Out of 273 HT connections, KSEBL allowed incentive for 65 nos. amounting to ₹ 10.14 lakh per month and only 126 nos. are penalized (₹18.54 lakh per month). For the remaining 82 nos., there is no penalty or incentive as above G.O. provides that no penalty and incentives for consumers with leading power factor. Action is in progress to upgrade all the Static Capacitors of required specification to avoid penalty.
4	35	Water Resources	The Committee express dissatisfaction over the financial mismanagement in KWA and the practice of diverting plan funds. The Committee recommends to recoup the diverted amount within the financial year.	From the formation of Kerala Water Authority, it has never earned any surplus income and is always running at a revenue deficit. The revenue deficit is partially made good with the non-plan grant received from the Government of Kerala. Due to continuous deficit many of the revenue expenses are pending including power charges to KSEB Limited. Kerala Water Authority takes the establishment charges included in the work estimate to revenue. Now there is no diversion of plan funds to non-plan.

			Additional Information sought on Para 35 The Committee directed the department to furnish the present status of the recommendation to recoup the diverted amount within the financial year.	The amount of ₹ 95.00 crore was utilized for the payment of power charges arrears against demand of ₹ 138.00 crore. The amount had already been recouped. It is also submitted that there is no diversion of plan fund from 2016-17 onwards.
5	36	Water Resources	The Committee observes that KWA surrendered ₹ 350.24 crore of budget provision during 2008-2013 due to non-implementation of projects in time. Therefore the Committee urges to implement the projects in time bound way and avoid delay in acquiring land, obtaining permission from NH Authorities / Railways.	Delayed handling over of required lands and permission from other agencies have resulted in under utilisation of budget provision. KWA has already taken specific measures to overcome the issues in the implementation of the projects and to ensure the project implementation in time. The details have been furnished in reply to Para 32. However in most cases projects have been sanctioned based on the assurance from the local bodies concerned relating to land availability. At present tender for the works are being placed only after getting the land in possession. But in order to get the Railway crossing and NH cutting permissions, even though KWA takes all efforts to

				get sanction in time, the decision of the authorities concerned will be based on their procedures in which KWA has no role. However, in recent projects efforts are being taken to avoid railway crossings as far as possible if alternative solutions are available.
			Additional Information sought on Para 36 The Committee wants to know the current status of the recommendation to implement the projects in time bound way and avoid delay in acquiring land, obtaining permission from NH Authorities / Railways.	There was no surrender of funds but only surrender of balance budget allocation. This reason has been specifically shown in the surrender proposals of each year. KWA has already taken measures to ensure availability of land for implementation of projects as follows : 1. The Projects are monitored using the Project Alert System in KWA, (PASK) software in which the progress of projects is made available in the Public domain, both physical and financial. The field officers can register the progress and issues on acquiring land etc. This is being reviewed periodically at appropriate levels for taking remedial action.

				2. In order to avoid delay in getting road cutting permission from PWD, the online portal Right of Way (ROW) is utilized. KWA is authorised to use this portal vide G.O.(Ms.) No. 2/ 2021/WRD dated 6-1-2021. Accordingly, 15,303 applications were submitted up to 18-1-2021. Against this, 6417 Demand Notices and permission for 1649 works received. Required deposit has been remitted against 476 works. Deposit for balance works can be remitted based on the release of State Plan fund under the respective Heads. 3. The Railway sanctions are resolved at HQ level meetings with the Divisional Authorities of Railways. Further such requests are also registered in the recently constituted e-PMG Portal, patronised by the State and Centre, which enables early resolution of all such issues.
6	37	Water Resources	The Committee notes that the revenue collection was not sufficient to meet even 50 per cent of revenue expenditure. Therefore	It is a fact that the revenue collection is hardly sufficient to meet even 50% of the revenue expenditure. Within the limitations, KWA has been achieving commendable progress in revenue

			the Committee recommends that KWA should initiate urgent measures to maximize revenue collection as well as to curb non-plan revenue expenditure.	collection over the past years. It may be noted that the water tariff in kerala is very low starting with ₹ 4/KL. Almost 55% of the consumers fall in the <15KL consumption bracket in which there is no revision in tariff over the last 10 years. Considering these, the increase in revenue collection is substantial. Also the following steps are taken for improving revenue: 1. Maximising service connections: A target of 2,00,000 connections per year has been set and is being monitored closely 190430 nos. of new connections were achieved in 2017-18. 2. Annual collection targets have been set for each division and the status is monitored through Revenue Monitoring Cell of Kerala Water Authority. 3. Priority is given for projects to utilise the already installed production capacities and laying distribution system in areas where

				production components have already been completed. This will help to service more areas and there by provide more service connections. 4. Rolling out ABACUS to all Sections: Steps are being taken to bring all connections under ABACUS so as to have better control and monitoring of revenue collection. 5. Establish Anti Water Theft and Leak Detection squads in all districts. A proposal submitted by KWA for establishing Anti Water Theft and Leak Detection Squads is under examination by Government and this will help to cut revenue loss considerably. 6. Replacement of old and damaged pipes for reducing leakage and Non Revenue Water. 7. Mapping connections to schemes is in progress in ABACUS to evaluate health of

				schemes and to take connective steps on a case to case basis. On the expenditure side, substantial reduction may not be possible as major expenditure heads like salary and power charges are beyond the control of KWA. Expenditure on other heads like repair and maintenance is already much less than required and further reduction would result in deterioration of service quality. However on the power charges side, KWA is taking the following steps to curtail expenditure. I. Replacement of old pump sets with energy efficient pump sets. II. Avoiding penalty by maintaining power factor above 0.90. III. Disconnecting power connection to unutilised pump houses. IV. Rationalising connected load/ contract demand issues.

				V. Energy audit with the help of Energy Management Center. Energy audit to all AMRUT lines through EESL.
			Additional Information sought on Para 37 The Committee wants to know the current status on the measures taken by KWA to maximize revenue collection as well as to curb non-plan revenue expenditure.	The revenue collection has increased above 50% from the year 2016-17 as shown below: 2016-17 - 55.24% 2017-18 - 54.74% 2018-19 - 56.39% 2019-20 - 56.92% 2020-21 - 57.58% (Compiled from Annual Accounts for the above years under submission for C&AG Audit). The revenue collection has also increased due to increase in number of water connections. Total number of water connections has been increased from 13.67 lakh as on 31-3-2015 to 31.61 lakh as on 31-3-2021. The Demand V/s. collection since 2014-15 are shown below:

Year	Demand (Rs. In Crore)	Collection (Rs. In Crore)	%of Collection to demand
2014-15	488.86	372.51	76
2015-16	562.96	444.9	79
2016-17	729.74	512.96	70
2017-18	822.68	542.36	66
2018-19	845.9	545.38	64
2019-20	931.46	723.08	78
2020-21	1037.15	601.45	58

There is revision of tariff for water charges with effect from 1-4-2021 as per G.O. (Ms.) No. 9/2021/WRD dated 10-2-2021, @ 5% annual hike on floor rate of 2014 revision. However, drinking water upto 15,000 liters per month is supplied to about 5.12 lakh BPL families free of cost.

(i) With the implementation of JJM Projects, the number of water connections increased and this

				will hike the revenue income from water charges. (ii) Annual collection targets is monitored by RMC at Head Office Level and Chief Engineer / Deputy AM at Regional Level. Circle level monitoring is done by Superintending Engineer and Accounts Officer. Revenue monitoring is done upto Division Level by Executive Engineer and Revenue Officer. (iii) Rolling out of ABACUS in all Revenue Section Offices under KWA has been completed. (iv) The replacement of old and damaged pipes for avoiding leakage under different schemes like JNNURM and Non Revenue Water is in a phased manner. (v) To monitor the leaks, loss, unauthorized tapping and theft in Distribution System, a unit of Anti Water theft Squad is operating in Central Region under the control of Chief Engineer (Central Region). In Thiruvananthapuram area, a leak

				detection squad is constituted to operate with limited powers than that in Central Region and monitoring. In other areas, no separate system is constituted for AWTS. But through special surveillance works within Division and Sub offices, leaks, unauthorized tapping and theft are monitored regularly. (vi) Replacement of faulty water meters are done regularly and monitored in revenue review meeting from Head Office to Sub Division level and targeting on 100% working water meters. Directions have been issued to replace faulty meters at the cost of Consumers and if they are not willing, at the cost of KWA and recover the cost through their future bills. (vii) KWA has taken earnest efforts to curb non-plan expenditure (Revenue Expenditure). As part of it, steps have been taken to reduce power charge as detailed below: i) About 89 HT connections in which connected load is higher than Recorded maximum Demand

				were identified. Requested the CMD, KSEBL (October. 2021) to reduce Connected Load which will result in monthly savings of ₹ 23,75,345 and thereby annual savings of ₹ 2.85 Crore. The full board of KSEBL has given approval for the same in its meeting held on 15-12-2021. ii) As detailed against Para No. 34, the penal charges for power factor has been reduced considerably from Rs. 4.35 crore to Rs. 1.04 crore per annum.
7	38	Water Resources	The Committee recommends to take necessary steps to recover arrears of Rs. 532.83 Crore towards water charges defaulted mainly by Government Departments and Autonomous Bodies.	Major defaulters of KWA are Government Departments and Local Self Government Institutions (LSGIs). There are certain limitations in disconnecting the defaulted water connections of Government Departments and in the view of the huge arrears, this fact has been brought to the notice of the Government during higher level discussion. The KWA was directed directions to conduct Adalath exclusively for Government Departments and LSGIs. Accordingly two revenue adalaths for Government Departments and LSGIs have been conducted during January 2018 under all

				the Divisions of Kerala Water Authority. 1769 Nos. of consumer attended the Adalath and 1342 Nos of cases were settled. ₹ 51.87 crores of fine and penal interest have been waived off in the adalath and 7.42 crore has been collected in cash. An amount of ₹ 20.49 Crores is to be remitted as per the adalath settlement. The Chief Secretary convened a meeting on 16-3-2018 to discuss the settlement of dues of KSEBL from KWA. The huge water charge arrears of various LSGI & Government Department was brought to the notice of the Chief Secretary and Chief Secretary directed to recover the dues of Government institutions and LSGD from source by Finance Department and to remit the same to KSEBL. As per the direction of the Chief Secretary, 24% per annum of fine applicable to water charge dues of Government institutions has been reduced to 6% for OTS payments. Thus the arrears of Government Institutions and LSGDs are re-calculated as Rs. 371.72 Crore as on 31-12-2017. Consumer wise list were forwarded to the Finance Department for recovering the arrears of all Government

				Departments, LSGIs from source. Moreover, in the meeting chaired by Principal Secretary, Finance on 29-10-2018 to discuss various issues related to settlement of dues of electricity charges and water charges by Government Department and LSGIs, it has been decided interalia to conduct a meeting with Government Departments by the Secretary, Finance (Expenditure) to discus and provide adequate Non plan funds from next year on wards to these Departments for settling the dues of water charges and electricity charges. Kerala Water Authority is taking all possible steps to collect the dues from defaulters.
			Additional Information sought on Para 38 The Committee wants to know the current status on the measures taken to recover arrears of Rs. 532.83 Crore towards water charges defaulted mainly by Government Departments and Autonomous Bodies.	As on 1-12-2021, the dues from the Government Departments and Autonomous/PSUs stood at Rs. 483.34 Crore and 13.35 Crore respectively. Letters have been issued to Heads of Department requesting early settlement of dues.

8	39	Water Resources	The Committee expresses its dissatisfaction on the purposeful lagging of drinking water supply scheme related to Cheruthuruthy and Nedumpura village in Thrissur districts and there by denying drinking water to these villages and causing an unfruitful expenditure of ₹4.67 crore. The Committee wanted to furnish a report on the present status of this project.	The major components namely, 4 MLD Water Treatment Plant, sump and 98% of compound wall had already been completed and partially commissioned on 12-7-2017 and supply effected through the existing distribution network and 70% of the project area was already covered by commissioning of 4 MLD Water Treatment Plant and sump, The balance area can be covered only after completing the Railway Crossing work arranged by P.H. Division, Thrissur. The balance work related to Package-I such as compound wall, road repairing, flow measuring equipment, scours line etc., are in progress and nearing completion. The detailed report on the project is as follows: SPAN-WSS to Cheruthuruthy and Nedumpura Villages Package – Design, Construction and Commissioning of 4 MLD Water Treatment Plant, 10.42 LL Sump and compound Wall at Athikkaparambhu. The Administrative Sanction for the project was accorded vide A.S.No.KWA/HO/WN-7/08-09 dated 5-8-2008 of Managing Director, Kerala

				Water Authority for an amount of Rs. 814.00 lakhs and Technical Sanction was issued by the Chief Engineer, Central Region, vide T.S.No.KWA/CE/CR/34/08-09 dated, 14-8-2008. The project was arranged in two Packages namely; Package-I-Design Construction and Commissioning of 4 MLD Water Treatment Plant and 10.42 LL Sump and compound wall and Package-II Supplying, laying distribution system in Cheruthuruthy and Nedumpura Villages. The Package-I was arranged under Project Division Nattika whereas Package II – arranged under P.H. Division, Thrissur. The work for Design and Construction of 4 MLD Water Treatment Plant and 10.42 LL sump and compound wall was tendered on 28-11-2009 and the work awarded to Mohammed Kunhi, Contractor with agreed PAC ₹ 374.25 Lakhs. The Agreement was executed for the work on 21-6-2010 vide Agreement No. 02/SE/PHC/ TSR/2010-11. Due to technical reason, it was required to revise the design of the plant, the

				position of filter house etc. The revised Design of the water Treatment Plant was approved and obtained from WASCON on 4-6-2012. Work was commenced at site on 30-3-2012.
			Additional Information sought on Para 39 The Committee wanted to furnish a report on the present status of Drinking Water Supply Scheme related to Cheruthuruthy and Nedumpura village in Thrissur district.	The Package I of this schemie – Design, Construction and Commissioning of 4 MLD treatment plant and 10.42 LL sump and compound wall at Cheruthuruthi and Nedumpura Villages was completed and handed over to PH Division, Thrissur on 31-1-2020. The Package II in the mentioned work was to lay the pipe line under Railway track, for which the Railway authority denied permission. Instead, permission was granted for laying the pipe line along the over bridge. So the pipe line could not be laid at that time. Hence this proposal was included in Jal Jeevan Mission Phase II – 3rd SLSSC and issued the Administrative Sanction and Technical Sanction. Tendering process is in the progress.

9	40	Water Resources	The Committee observes that the Kottayam Water Supply Scheme Kuriyottumala project, Kattappana Ayyappankoil Elappara water supply project etc. are still incomplete even after so many years of their commencement and recommends to examine the factors hindering the progress of these projects. The committee wants to furnish a detailed report on the incomplete water supply scheme of water authority.	• .Kottayam WSS – Completed • WSS to Kuriyottumala (WSS to Pathanapuram - Piravanthoor) in Kollam District – Completed. • Wss to Elappara – Completed. • WSS to Kattappana – Ayyanpankovil : CARWSS to Kattappana and adjoining Villages was sanctioned on 20-11-2002 for Rs. 1832 lakhs. Revised sanction was issued on 26-11-2002 for Rs. 2314 lakhs. The project envisaged coverage of the entire area of Kattappana, Ayyapankovil and Kanchiyar Panchayaths with potable water targeting 120000 people. The major components of the Water Supply Scheme have been completed except the electro – mechanical works. A proposal submitted under SLSC 2016 for an amount of 9 crore, for arranging the balance works. Due to shortage of NRDWP funds, the AS has been cancelled. Hence the balance electro – mechanical works and

				distribution works in Ayyanpankovil Panchayath is proposed under KIIFB 2017-18. In principal approval for the above project been accorded by Government. The approval of KIIFB is awaited.
			Additional Information sought on Para 40 The committee wants to furnish a current status on the incomplete water supply scheme of water authority regarding Kottayam Water Supply Scheme Kuriyottumala project, Kattappana Ayyappankoil Elappara water supply project etc.	CARWSS to Kattapana and adjoining villages was sanctioned on 20-11-2002 for Rs. 1,832 Lakhs. Revised sanction was issued on 26-11-2002 for Rs. 2,314 Lakhs. The project envisaged coverage of the entire area of Kattappana, Ayyappankovil, Kanjiyar Panchayaths with potable water targeting 120000 people. The major components of the water supply scheme have been completed except the Electro Mechanical works. Due to the shortage of AS amount for completion of the scheme, a proposal was prepared under SLSSC, 2016 for an amount of Rs. 9 Crore for arranging the electrification and balance works. Due to the shortage of NRDWP funds, the above work was cancelled. Hence the balance Electro Mechanical Works, Distribution Works and Weir in Ayyappankovil Panchayath were proposed under KIIFB 2017-18 and the Administrative Sanction

				has been accorded for Rs. 4,642.4 lakhs in 2018 vide order no. WRD-025-06 PA-01 dated 13-11-2018. Technical sanction was also obtained to implement the work through 3 packages. Even though the tender was invited 2 times, nobody has quoted the work. Then these three packages were combined and a Global Tender was invited. But only one firm has quoted for this work. Hence the work was re-tendered due to single tender and this time also only one firm has quoted the same. Under these circumstances, the above tender was cancelled by Tender Committee with a direction to implement the order no. GO (P) No. 114/2021/Fin dated 13-8-2021 and to revise the estimate based on DSR 2018 in compliance with Head office direction. Based on this direction, the estimate as per DSR 2018 is prepared. Tenders invited again and cancelled since a single qualified offer was received. The re-tendering is in progress. The detailed status of the work is as noted below:- Works Taken Up Under ARP

SL No.	Name of Work	Status
1	Well	Completed
2	Raw Water Pumping Main (Thonithady Source to TP)	Completed
3	WTP	Completed
4	GI Tanks and Sump (7Nos)	Completed
5	Clear Water Gravity Main (Alady Kurisumala to Kalthotty)	Not started (due to paucity of ARP fund, the contractor did not start the work)
6	Clear Water Pumping Main (WTP to Alady Kurisumala)	Completed
7	Clear Water Pumping Main (Kalthotty to Lebbakkada)	Completed

				8	Clear Water Gravity Main (WTP to Marykulam Zone 1)	Completed
				9	Clear Water Pumping Main (Kalthotty to Nariyampara Top)	Not started (due to paucity of ARP fund, the contractor did not start the work)
				10	Clear Water Gravity Main (Nariyampara top to Idukki Kavala)	80% completed (due to paucity of ARP fund, the contractor did not complete the work)
				11	Clear Water Gravity Main (Idukki Kavala to Kochuthovala)	Completed
				12	Distribution System in Zone II (Kanjiyar Pt)	Completed

13	Distribution systeme Zone IV (Kattappana Pt)	Completed

Work Taken up under NRDWP

Sl. No.	Name of Work	Status
1	Distribution system in Ayyappankovil Pt.	Completed
2	Distribution system in Kanjiyar Pt. And clear water pumping main from Kalthotty to Meppara	Completed
3	Distribution system in Kattappana and Gravity Main from Nariyampara Top to Bottom	Completed
4	Gravity Main from Idukki Kavala to Mulakaramedu and distribution system	Completed

10	41	Water Resources	The Committee suggests that the simultaneous collection and distribution of water will render the water supply projects fruitful and effective in time and recommends to take necessary steps to carry out this likewise.	Earlier water supply projects were arranged as a Comprehensive water supply scheme including collection, treatment and distribution system. But various factors like delay in handing over of required land by local bodies, delayed permission from Railway, PWD, Electrical Inspectorate etc. have delayed the implementation of the entire project and the completed scheme component, became idle for long time for want of completion of minor balance components of the projects. This resulted in delay and cost over-run of the projects. Hence, later KWA Board have directed to arrange the comprehensive water supply projects in a phased manner. Taking into consideration the fund availability, the time required for the completion of the major components etc., at present the distribution work is being taken up or sanctioned only when the production components are nearing completion, It is also likely that the distribution system will fail if it is laid for long without charging or without using for a long time. The distribution in last phases the following advantages

				are there:- • blocking of funds can be avoided. • More number of schemes can be considered simultaneously • possibility of investing funds for procurement of pipes in the initial stages of project implementation can be controlled and thus the possibility of dead investment can be avoided. • Once the production components are completed and treated water is available, the distribution system can be taken up utilising other funds such as local body fund, MLA/MP fund etc.
			Additional Information sought on para 41 The Committee wants to know steps taken to carry out simultaneous collection and distribution of water in water supply projects as recommended by the Committee.	Before the JJM Project was launched by the Government of India, most of the projects implemented by KWA were having insufficient fund flow and hence KWA was forced to move for phasing the Projects. The production components, transmission/ storage components and distribution system were done in separate phases. But the JJM objectives to provide FHTCs to all rural

				households by the end of March 2024 and the project has sufficient fund flow. Hence as part of JJM project, all the WSS of KWA, which had only production components are proposed to include distribution systems till the consumer connection. All the WSS to KWA for which minimal level of treatment and distribution alone was existed are now considered under JJM to provide full fledged water treatment plant and end mile connectivity to the consumer. Areas where no WSS existed also are now considered under JJM and full fledged WS projects are proposed. Thus on completion of all these projects, simultaneous collection and distribution of water will be made possible as suggested by the Committee.
11	42	Water Resources	The Committee expresses its dissatisfaction on the non functioning of the Revenue Monitoring Committee in Kerala Water Authority and recommends to strengthen the Revenue	Revenue Monitoring Committee (RMC) headed by the Managing Director and Technical Member, Regional Chief Engineers, Accounts Member etc. as members is existing in KWA to monitor the revenue collection in KWA. During the past few years its function was in slow pace. During

			Monitoring Committee to ensure effective collection of revenue and to computerise the accounting system.	December 2017, the RMC was convened by the Managing Director in connection with Revenue Adalaths in KWA. In the meeting held on 19-6-2018 in the chamber of Technical Member, it was decided to conduct RMC meetings frequently so as to accelerate the revenue collection and to collect the outstanding arrears from the defaulters. Accordingly, a video conference was arranged on 3-7-2018 to review the progress of data migration to e-abacus software, connection status, Revenue Recovery procedure, Revenue target, etc, The following decisions were taken in the above RMC meeting:- 1. Monthly Revenue meeting to be conducted in all divisions. 2. RMC Units shall monitor high value connection across the State and all bulk connections with consumption more than 250KL. 3. Regional Chief Engineers shall monitor 50 major connections in all circles 4. Superintending Engineers shall monitor 100 major connections in all divisions.

				5. Executive engineers shall monitor all Non domestic connections, Meter Replacement, unidentified connections etc.It was suggested to conduct Video Conference in every month for review with special focus on revenue collection.
			Additional Information sought on para 42 The Committee wants to know the steps that has been taken to strengthen the Revenue Monitoring Committee to ensure effective collection of revenue and to computerize the accounting system.	(i) Revenue Review meetings are conducted regulary which is headed by the Managing Director covering all the Divisions. Due to earnest effort, the Revenue collection for the period 2020-21 was Rs. 601.45 Crore and collection for the month of March alone stood at Rs.115.71 Crore. During the year 2021-22 (up to November 2021) ten Review Meetings were conducted (on 18-6-2021,25-6-2021,2-7-2021,15-7-2021, 29-7-2021, 8.-9-2021, 23-9-2021, 6-10-2021, 23-10-2021 and 03-11-2021). (ii) RMC unit is monitoring high value consumers directly and through Revenue Officers. Reminder letters have been sent to Heads of different Government Departments requesting settlement of huge arrears. (iii) In addition to this, Chief Engineers of Regions

				are making reviews by the help of Deputy AM in this aspect.
12	43	Water Resources	The Committee recommends that steps should be taken to allocate fund for acquiring land even while a project is in its budding stage.	KWA finalises proposals for water supply projects in which the provision for land acquisition is to be done by local bodies. But in some occasions the local bodies do not hand over the required locations in time. The local bodies initially agree or pass resolution that the land will be handed over by them for the project. But after getting sanction for the project, the earlier stand taken by LSGIs may not be adhered to. In such cases, deviation in the original scope is warranted which in turn results in change in the design, project cost including the cost of the land. Now actions are initiated to procure required land utilising the State Plan fund. However, the limited budget allocation has its own limitation on procuring all the land required for the projects.
			Additional Information sought on para 43 The Committee wants to know the steps taken to allocate fund for acquiring land even while a	*Land acquisition cost is not allowable in guideline for JJM, AMRUT, NABARD projects where KWA is only an implementing agency. Hence the provision of funds for Land Acquisition cannot be included in the DPR. But in the case of KIIFB, RKI, the*

			project is in its budding stage.	*provision for LA is included as per the Guidelines of the funding agency. In State plan proposals also, LA cost can be included in the DPR itself, if necessary, and land not made available by LSGIs.*
13	44	Water Resources	The Committee exhorts to take rapid action to provide water connections ~~to consumers~~ consumers with from Ranni Major Irrigation Project until Jalanidhi Project gets commissioned.	Water Connections are being given from Ranni Major Scheme(CWSS to Ranni, Pazhavangadi & Vadasserikkara) to Jalanidhi area after obtaining an undertaking from the consumers to the effect that they will transfer the KWA connection to Jalanidhi as and when the scheme is commissioned.
			Additional Information sought on para 44 The Committee wants to know the steps taken to provide water connections to consumers from Ranni Major Irrigation Project until Jalanidhi Project gets commissioned.	KWA has provided water supply from the scheme Ranni Pazhavangadi-Vadaserikkara in the area where Jalanidhi Scheme was being implemented. The Jalanidhi schemes of Ranni-Oottupura and Ranni-Thattekkad were commissioned on 10-9-2017 and 25-9-2017 respectively. Hence the recommendation of the committee is complied with.
14	45	Water Resources	The Committee accuses the Water Authority for not providing enough water connection in some areas and recommends to facilitate pipe extension to areas which face	KWA takes measures to provide water connection as much as possible. Present number of connections is 23.30 lakhs. Last year's achievement is 1.90 lakhs. Next year's target is 2.70 lakhs. Now annual work plan is finalised for the financial year

			water scarcity. It also emphasizes the timely allotment of fund for the installation of distribution of lines nearing completion.	in which major thrust is given to improve the connection and revenue. Specific target is fixed to all the officers concerned up to Assistant Engineers. Regular monitoring at various levels is being done to evaluate the progress. However it is observed that the high cost associated with house connection due to the enhanced rate for road cutting sanction from PWD/LSGD after the commissioning of the projects resulted in poor house connection in all schemes. Hence, it is required to develop new proposals to provide subsidised house connection along with project implementation as done in JICA project, to ensure maximum connection with minimum investment of the consumer. Additional budjet allocation is required for this. By this KWA can maximise the house connection along with the project commissioning and can ensure the financial sustainability of the scheme. Regarding pipeline extension in water scarce areas, priority is given to water scarce areas subject to feasibility. The fund for the ongoing works is being allocated depending

				on the budget provision. At present priority is given to those projects which are nearing completion and which will render immediate benefit to the people.
			Additional Information sought on para 45 The Committee wants to know the measures taken to extend pipe to areas which face water scarcity and timely allotment of funds for installation and distribution of pipe lines which are nearing completion.	As pointed out by the Committee, KWA was not able to provide enough water connection in some areas prior to the declaration of JJM by Government of India, since the fund flow of the ongoing projects was very slow. During that period also, KWA was trying to facilitate pipe extension to the areas which faces water scarcity by posing such proposals under the Heads where funds are available. Priority was also given for allotment of funds for the installation of distribution line nearing completion. These are in line with the recommendation of the Committee. In JJM projects, KWA does not have such restrictions of fund flow. Hence, all rural areas of the State can be covered by the end of March 2024.
15	46	Water Resources	Considering the water scarcity and drought related issues the	Providing drinking water kiosks is the responsibility of respective District Collectors and

			Committee wants to furnish the current status regarding the installation of water kiosks in every village.	is normally provided and managed by the Revenue & Disaster Management Department. However, the drining water to be supplied through the kiosks is provided by Kerala water Authority through filling points located at the KWA premises. Revenue authorities/LSGI collect drinking water from these filling stations and transports through tanker lorries to the kiosks.
			Additional Information sought on para 46 Considering the water scarcity and drought related issues the Committee wants to know the current status regarding the installation of water kiosks in every village.	Prior to the implementation of JJM, water scarcity and drought related issued were dominant and water kiosks were installed wherever necessary on demand. KWA proposes to provide piped water connection to all the households of the state by 2024 and thereby water shortage in majority of the areas in drought period can be solved. Source improvement work and construction of water treatment facilities from perennial sources, being implemented as part of JJM also reduce the possibility of acute water shortages during drought seasons in future. Even then KWA is providing sufficient water to kiosks at public places, if necessary, on demand.

16	47	Water Resources	The Committee expresses its dissatisfaction that the water supply schemes in Vandanmedu-Anakkara village has not been commissioned or even the land was not acquired after a period of 15 years and with an expenditure of ₹ 5 crores 18 lakhs and abandoned the scheme. The Committee recommends that viability of the project should be ensured before commissioning the scheme and directs to furnish the report of the Vandenmedu Panchayath giving assurance to procure land for the project and the original project report of the said scheme.	ARWSS to Vandanmedu-Anakkara Villages was sanctioned in 1995-96 for an amount of Rs. 518.98 lakh under NRDWP. It was envisaged to cover the Vandanmedu and Anakkara villages benefiting a population of 48250. All the components of the project except the proposed weir of 5 M height were already completed. While preparing the project report itself it was obvious that the flow in the river is meager. Hence a weir of 5 meter height was proposed in the project report itself to ensure adequate stroage during summer. The Panchayath issued a resolution to the effect that the land liable to be submerged will be taken over. But till date the panchayath has not succeeded in taking over the land. Hence the construction of the weir could not be proceeded with. The only solution to overcome the situation is to utilize Idukki Dam Reservoir, the one and the only available sustainable source of Idukki District. A proposal is under consideration for the utilisation of already completed components. It is proposed to have a comprehensive project with the source on the bank of Idukki Reservior covering 18 panchayths

				including Vandenmedu Panchayath. The project is indented to cover a population of 316100 out of 1108974 as per 2011 census in Idukki District. The MD, KWA has been instructed that the viability of the projects should be ensured before commissioning the schemes in future and the MD, KWA has given assurance in this regard. A Copy of the Original project report of WSS to Vandanmedu-Anakkara Village is attached as Annexure- I.
			Additional Information sought on para 47 The Committee wants to know the current status of water supply scheme in Anakara and Vandenmedu Panchayaths.	CARWSS to Vandanmedu and Anakkara Villages was sanctioned on 12-3-1996 for Rs. 518.98 Lakhs. The project envisaged coverage of Vandanmedu and Anakkara Villages with potable water calculating 48250 people. The components like well at Amayar, WTP, GLSRs and Pumping Mains of this water supply scheme are completed. The major component for the source of this scheme was a RCC weir of height 5m. When the weir is constructed, an extent of 5 hectares of agricultural land will be submerged. KWA requested the panchayath several times to hand over the land. But the land could not be handed over by the

				Vandanmedu Panchayath authorities due to the protest of cardamom planters. Hence the weir was not constructed and the source "Amayar" dried up and is not adequate for a WSS. So, the scheme could not be completed and commissioned. As the source is inadequate, the only solution to overcome the situation is to utilize an alternate water source like Idukki Dam reservoir or Mullaperiyar Canal, the only available and sustainable sources of water nearby this Panchayath. But the implementation of a Water Supply Scheme using these sources exclusively for Vandanmedu and Anakkara Villages is not economical by considering the peculiar topography of project area, high altitudes with highly undulating terrains in Idukki District. Hence a comprehensive water supply schemes for covering 18 Panchayaths including Vandenmedu in Idukki district was proposed. Now as part of "JAL JEEVAN MISSION", a new proposal for Vandenmedu, Chakkupallam, Karunapuram and Vandiperiyar Panchayaths by using the Mullapriyar reservoir as the source has

				been submitted and is included in the Agenda of 4th SLSSC. The proposed scheme is intended to provide FHTCs to all households of Vandenmedu and adjoining 3 panchayaths by utilizing feasible existing components under the scheme "CAR WSS to Vandenmedu and Anakkara Villages".
17	50	Water Resources	The Committee opines that the water authority should make genuine effort to improve professionalism. The Committee emphasizes the necessity of sufficient study before preparing projects. It also recommends the cancellation of indefinite projects and fix responsibility and recover the amount from the officers responsible.	KWA prepares project after proper survey and investigation. In most cases the delay in completion of projects is due to the reasons beyond the control of KWA such as land availability, sanction from other Departments, etc. At present complete Detailed Project Report is prepared before the commencement of projects. KWA has prepared a Comprehensive District Plan (CDP) and priority has been given in planning projects based on the CDP. Priority has been given to water scarce areas and also to distribution networks of those projects in which production components have been completed. At present Annual Work Plan is prepared in which specific targets have been prepared for various activities such as water connection, revenue collection, project implementation, etc. In order to strengthen the

				project implementation activities, restructuring of head office has been completed and exclusive wing for Planning, Monitoring and Operations have been formed. A separate IT wing is also formed and various IT related activities are being taken up by that wing. Genuine efforts are being made to resolve the issues at various levels and to ensure benefits to the public. In such cases the cancellation of the projects will be considered after evaluating all the possible ways to materialise the Projects. Utilization of installed capacity is being given high priority. Professional NRW management, Customer friendly online, new connection facility, payment of water bills, etc. are being worked upon.
			Additional Information sought on para 50 The Committee wants to know the current status of the measures taken on the recommendation of Committee to cancel indefinite projects, fix responsibility and recover the amount from the officers responsible.	As part of improving professionalism in KWA, the following measures were implemented:- 1. A web based project monitoring system was developed and being utilised for weekly review, updation of data, risk management etc. 2. Similarly, for the Water Supply Schemes being operated and maintained by KWA, maintenance works, their payment and the manpower engaged for operations etc. are managed through out the

				State using a dedicated software viz. Monitoring Accounting & Reporting by Centralized HR system (MARCH). 3. For addressing public grievances, a call centre at the CCU buildings as well as an information system helps a lot to improve the services to the public. As recommended by the Committee, before preparing the project sufficient study on feasibility is done by PPD wing of KWA. Indefinite projects are being short-closed by the competent authorities regularly and in all such cases, defaulters are identified and penal measure are being taken. Thus, the recommendation of the Committee has been complied with.

CHAPTER – II

ACTION TAKEN STATEMENTS FURNISHED BY THE GOVERNMENT ON THE RECOMMENDATION OF THE COMMITTEE WHICH HAS BEEN ACCEPTED BY THE COMMITTEE WITH REMARKS

Sl. No.	Para No.	Department Concerned	Conclusions/Recommendations	Action Taken by the Government
1	48	Water Resources	The Committee evaluates that the performance of the water authority is not up to the mark. It directs that the Authority should locate spots where water loss from leakage, theft etc, takes place and take urgent steps to curb it. Committee also suggests that for carrying out proper water audit meters should be installed at all the main water supply schemes.	Kerala Water Authority has taken proactive measures of curbing the Non-Revenue Water figures through pipe replacement, installation of bulk flow meters for measuring the quantity of water produced, measures for maximising billing, and has also taken necessary action for the formation of anti-water theft squads and leak detection and surveillance squads. The details are given below. 1. Under the AMRUTH Scheme, Rs.146.75 Crores has been allocated for the renovation of water supply schemes. These works include the replacement of old and leaking pipelines. 2. Replacement of old and damaged pipelines are being

				planned in KIIFB schemes also, in which Rs. 433.33 Crores has been allocated for pipe replacement. 3. In addition to the above, funds have been allocated under State Plan 2016-17 and 2017-18 for pipe replacements and the works are being arranged. A project to ensure 24X7 Water Supply in three cities-Thiruvananthapuram/Kochi/ Kozhikkode has been taken up with ADB Assistance. One of the objectives of the project is to reduce NRW to the National bench mark figure of 20%.
			Additional Information sought on para 48 The Committee evaluates that the performance of the water authority is not up to the mark. It directs that the Authority should locate spots where water loss from the leakage, theft etc. takes place and take urgent steps to curb it. Committee also suggests that	As part of improving the water supply operational performance of KWA, following actions have been taken:- 1. To locate the spots where water loss from leakage, theft etc. takes place, a Non Revenue water and Anti water theft squad is functioning under the CE, Central Region with the leadership of an Assistant Executive Engineer. A leak detection squad with minimum facilities is functioning under the Trivandrum water scheme area. Though special facilities are not available under the remaining areas, leaks and thefts are being detected and rectified by general surveillance regularly.

			for carrying out proper water and audit meters should be installed at all the main water supply schemes. The Committee wants to know the current status of measure taken on the recommendation.	2. For the urgent rectification of leaks detected, Blue Brigade is functioning under Trivandrum WS project in all other maintenance Divisions of KWA. Running contract are arranged for immediate leak rectification. 3. For carrying our water audit, flow meters are installed at locations in main WS projects throughout the State.
2	49	Water Resources	The Committee recommends that the Kerala Water Authority should adhere to the prevailing water distribution system and impose methods to expand the institution rather than switching over to bulk water system proposed by different sources.	In order to strengthen KWA, adequate financial and physical support are essential. To improve the service, the present staff pattern is to be revised. A lot of new projects have been commissioned and more are to be completed. But there is no change in the number of staff during last 30 years compared to the expansion in water supply coverage. This creates lot of issues in managing the system. All existing and ongoing water supply scheme require exhaustive field management, liaison with various agencies like Railway, PWD, NHAI, LSGDs, PCB, Factories and Boilers Department, Electrical Inspectorate, KSEB and finally the consumer management. The budget provision is also an issue in providing portable drinking water to the water scarce areas. KWA has already requested

				allocation of a portion of fund from 14th Finance Commission grant of the local bodies for the maintenance of the water supply projects by KWA. However, KWA is striving to deliver better service with in the available facilities.
			Additional Information sought on Para 49 The Committee recommends that the Kerala Water Authority should adhere to the prevailing water distribution system and impose methods to expand the institution rather than switching over to bulk water system proposed by different sources. The Committee wants to know the current status of measures taken on the recommendation.	Prior to the announcement of JJM by Government of India, KWA was facing severe shortage of funds for installation or extension of distribution system all over the State and hence proposal for providing treated water to Grama Panchayath as a bulk consumer was agreed by KWA for a few Panchayaths in the State. After the announcement of JJM, since sufficient funds are available, KWA has explored the methods for expansion of the institution and bulk water supply to Panchayath are not considered now. Instead, KWA is proposing completion of distribution systems in all Grama Panchayaths of the State so that KWA will be able to provide quality assured potable water to all rural households in the State before 31st March 2024 and thereby Institutional arrangements to assure the quality of water thus applied, is also being arranged by KWA. Thus the recommendation of the committee is fully complied with.

Remarks:

1. The committee suggested to invigorate the work of anti-theft squad in water authority.
2. The Committee suggested that schemes under Jal Jeevan Mission should be completed in time and if there is any hindrance occurs it should be intimated to the Committee.

Thiruvananthapuram,
11-2-2025.

E.CHANDRASEKHARAN,
Chairperson,
Committee on Public Undertakings.

PROJECT REPORT FOR

C.A.R.W.S.S. TO VANDANMEDU AND [illegible] VILLAGES IN IDUKKI DISTRICT

Contents:-

1. Project at a glance
2. Engineering Report
3. Design calculations

Maintenance Estimate

Detailed Estimate of the Project

Appendices

Drawings

PROJECT AT A GLANCE

1.	Name of the Scheme	Providing water supply arrangements to Vandanmedu and Anakkara Villages of Idukki District.
2.	Name of State/District	Kerala, Idukki
3.	Name of Villages proposed to be covered	Vandanmedu and Anakkara
4.	Population as per 1991 Census Total	30,049 Vandanmedu Village - 8574 Anakkara Village - 21474
	S.C	3,949
	S.T	333
5.	Design Population	40,250
6.	Per Capital Rate of water supply proposed	40 lpcd
7.	Source	Amayar
8.	Method of Extraction	Weir of Ht. 5 m. is proposed to be constructed across the river. Raw water transmitted to treatment plant by constructing a well cum pump house in the river bank near to this.
9. a.	Treatment proposed	Sedimentation, Filtration & Chlorination.
b.	Capacity of Treatment Plant	2.954 mld.
10.	Transmission Mains	
a.	Raw water pumping	300 MM GI. & 2950 M.
b.	Clear water pumping	150 MM GI (Medium) 5050 M 80 MM GI (Medium) 5458 M.
11.	No. of pump houses	2 Nos.

12. Reservoirs : 4 Nos.

1. Clear water sump T1 : 6.69 lakh lit.
2. G.L. Tank (T2) : 1.25 lakh lit.
3. G.L. Tank (T3) : 1.2 lakh lit.
4. G.L. Tank (T4 existing) : 30,000 lit.

Distribution system :

A. Total Length (approx.) : 81 Km.

a. Size of pipe : AC pipe = 80 mm to 250 mm, length = 6 Km.
PVC Pipe = 32 to 160 mm, Length = 65 Km.
GI Pipe = 32 to 100 mm, length = 10 Km.

[illegible] of taps provided : 193 Nos.

[illegible] Cost : 5.22 Lakhs.

[illegible]ke works : Rs. 11.00 lakhs.

[illegible]ment Unit : Rs. 6.24 "

[illegible]rvoirs : Rs. 10.55 "

[illegible]ibution main : Rs. 218.20 "

[illegible]ibution system : Rs. 204.00 "

[illegible]rification works : Rs. 2.45 "

Rs. 516.44 lakhs

[illegible]ntingency : Rs. 12.56 "

Total : Rs. 529.00 lakhs

[illegible] : Rs. 1.19/1000 lit/day

CHIEF ENGINEER,
[illegible] WATER AUTHORITY

(L[illegible]rge)

ENGINEERING REPORT

1. Brief description of the Project area

This project is proposed to supply water to the entire area of Vandenmedu and Anakkara Village in Idukki District. These Villages having 67.58 Sq.Km. in area located in the south east corner of Udumpanchola Taluk. Pampadumpara, Ayyappancoil and Chakkupallam Villages are lying adjacent to this village. Eastern boundary of the Village is Tamilnadu. Total population as per 1991 census is 30,048 (SC - 3949 & ST - 333).

Vandanmedu is listed as a problem village by Government of India in 1981 considering the drinking water facilities in the village. It is identified as a 'Category I' village - those not having assured source of drinking water within a reasonable distance (1.6 Km) or within a depth of 15 m - Considering the water supply facilities as on 1.4.91 it is classified as an 'A' Category village with water supply coverage of 24.53% (Sl. No. 842, Dist. code - I, Village code 080210) and the coverage per capita supply is less than 10 lpcd.

Topography of the area is very undulating with levels ranging from + 500 to 1660. Most of the inhabitants of the village are agricultural labours. The main crops are cardamom, Pepper, Coffee, Paddy and Tea. Annual revenue of the Village is 3,65,262/-.

There are 16 Harijan and 2 Girijan colonies. These colonies are spread out uniformly in the village. Public institutions in the village are P.W.D. offices, U.P. School, L.P. School, High School, Police Station, Post office etc. Total length of P.W.D. Road is about 55 Km and Panchayat road is 80 Km.

2. Existing Service Level

As on 1.4.91 only 24.53% of the total area of the village is covered with present water supply facilities. Five water supply schemes were commissioned in the village so far. They are as follows.

	Name of Scheme	Source	Year of commissioning.
1.	Vandanmedu P.W.S.	Amayar	1978
2.	Puliyanmala P.W.S.	Erakkadu river	1985
3.	Puttady P.W.S.	Open well	1982
4.	Sasthanmedu P.W.S.	Open well	1987
5.	Bore well with hand pumps.	3 Nos.	

In the above, Puttady P.W.S. and 3 Borewells are practically dry. Major portion of the service area of Sasthanmedu P.W.S. is outside this village ie. in Chakkupallam only 2 taps are provided in Vandanmedu village from this scheme. Moreover the source which is in Chakkupallam village - is also unhygenic. Hence the present facility if any from the above scheme is ignored and house sites are also considered for coverage from the proposed project.

Vandanmedu scheme was commissioned in the year 1978. Many of the pipes laid for that scheme are corroded. Moreover, once the weir proposed for the new scheme is completed, this will impose the intake of that scheme downstream, may face with scarcity of water. Hence the scheme is proposed to be rehabilitated through this proposed scheme by delivering water to its service reservoir. Necessary provision is given in the estimate for rehabilitating the distribution lines also.

Thus the only one scheme viz. RWSS to Puliyanmala can be considered as beneficial scheme, for which a population of 1500 is deducted from the projected population of the village.

3. Water demand of the project area:

Total Population of the village as per 1991 census is 30,048. Projected population in 2018 is 51304. Out of which 3000 persons are benefitted by the existing scheme viz. RWSS to Puliyannala. For a balance population of 48304 a new water supply scheme has to be formulated. Hence the ultimate water demand of the proposed scheme taking @ 40 lpcd as per capita demand, is 1.93 mld.

4. Details of proposed scheme:

1. Source. Source proposed for the scheme is Amayar river. Location of intake is 750 m upstream of the existing pumphouse for Vandanmedu W.S.S. The flow in the river is very meagre especially during summer months. Hence an impounding weir is proposed to be constructed across the river between chainage 300 and 325 as marked in the plan (plate No. 4 a) This site appears to be suitable for the construction of weir. It is a narrow gauge with high banks on either side, for about a height of 10 to 12 mts. Out crops of rocks are also visible at the site. The height of the weir is fixed as 5m, the F.R.L. being + 1052.50m. Even this is not sufficient for 90 days storage. But the height is restricted so as to eliminate the submergence of high valued plantation estate on both side of the river to the minimum.

Panchayat authorities have requested to change the source from the above to some 3 kms upstream at Mali. But this source is not suitable for the scheme. This area is this source is not suitable for the scheme. This area is thickly inhabited and the river stretch is highly polluted. In order to take care of the summer demand necessary storage of atleast 3 months will have to be created within the project area as there are no other dependable source. The site at Mali is also not suitable for construction of weir.

4.2 Treatment Unit

The river flow carries a lot of silt and deposits also along with it. Hence a slow sand filter proceeded by plain sedimentation tank is provided in the treatment unit. Treatment plant is located at a level of + 1158, 2960 m away from the intake point. Water is to be disinfected by chlorination before distribution, since large quantities of decayed vegetation is expected in the water. Capacity for the slow sand filter is 2.954 mld considering the working hours as 16.

4.3 Service Reservoirs

4 Nos. service reservoirs are proposed in the project area. Service reservoirs are designed for 4 hrs. storage. Capacity of sump near treatment unit acting as a balancing reservoir for Zone II, III & IV and service reservoir for Zone I. Hence the capacity of the same is calculated taking 4 hrs. storage for the demand of Zone I, directly distributed from sump and 1 hour storage for Zone II, Zone III & IV.

Details of service Reservoirs are as follows:

1. Clear water sump near Treatment Plant (T1) of capacity - 6.09 lakhs lit. at + 1155.00
2. G.L. tank for Zone II (T2) of capacity - 1.25 lakh lit at + 1172.00
3. G.L. Tank for Zone III(T3) of capacity - 1.20 lakh lit. at +1193.50
4. G.L. tank of Zone IV (existing) of capacity. - 30,000 lit at +1148.00

4.4. Transmission main

Raw water from the intake well is conveyed to the treatment plant by pumping with 100 HP pumpsets against a head of 121 m. Clear water from the Treatment Plant is collected in the

sump located at the T.P. site itself. Water from the sump is conveyed to Zone I & IV by gravity & to zone II & III by pumping.

The pumping main to zone II & III are common and the design is based on an intermediate critical peak point at about chainage 8520 m from Clear water sump near Treatment Plant. Size of the pipes are 150 mm G.I. (5050m) & 80 mm GI (5455m).

Here also water has to be raised against a high head of about 185 m. If such high head pumps are not preferred or not available intermediate boosting may have to be done. This aspect as well as the case of raw water are left to the discretio the authority issuing Technical sanction to the scheme.

16 hours pumping is considered for designing pumping main and pumps etc. Pumping mains have been designed against computed water hammer pressure & working pressure is taken together surge arrestors are to be provided in both the pumping mains to withstand water hammer pressure.

Distribution system.

Distribution area is divided in to 4 zones. Zone I low level zone, Zone II intermediate zone, Zone III high level zone and zone IV the area served through existing RWSS to Vand which is also rehabilitation through the scheme. 80 to 250 mm dia PE 32 to 160 mm P/O pipes and 32 to 100 mm GI pipes are pro the distribution net work considering the topography and of the ground. Total length of distribution system is 81kms. Since the area is very much undulating uniforma pressure could not be achieved in the distribution syst taps are provided in the area taking one tap per 250 persons location of tap points are marked in the site plant showing the distribution net work.

Project cost.

Total cost of the project is worked out as Rs. 52 lakh

Rs. 11 lakhs is provided for intake works, construction of weir and well cum-Pumphouse. Total cost of distribution system is 204 lakhs and that of pumping main is 218.20 lakhs. CI, S.I. pipes and A.C. pipes are to be laid in many lines, hence the higher cost. Provision for restoration of road cut open for laying pipe is included under the cost for distribution system. Rs. 2.45 lakhs is given as provision for rehabilitation of distribution system of existing Wandanmedu Water Supply Scheme 15% hill allowance is given for working charges since the area is in the Highlands of Idukki District.

6. Maintenance cost.

Maintenance cost of the scheme is worked out @ 2,41,000/- ie. Rs. 1.10/1000 litres.

Status of drinking Water Supply of the existing scheme as per R.G.N.D.W.M. Survey.

1. Village.

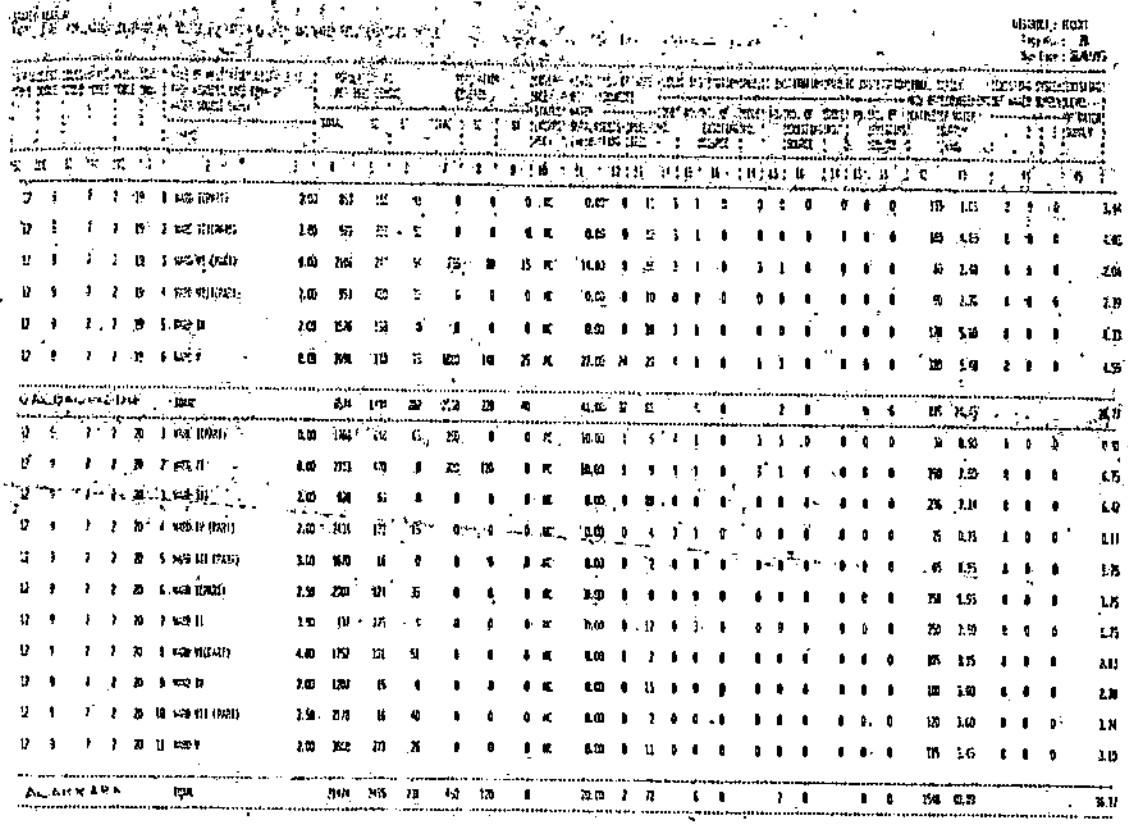
Total population benefited as per R.G.N.D.W.M. Survey in this village is 1,255 souls. Out of 6 habitations 2 nos are P.C and the rest are N.C. The level of Water Supply varies from 0 to

2. Village

Total population benefited as per R.G.N.D.W.M. Survey in this village is souls. Out of 11 habitation 2 nos. are P.C and the rest are The level of W.S. varies from 0 to 10 lpcd.

Chief Engineer.

(Designation ... Thang))



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STATE: KERALA

PART - I B1. DETAILS OF EXISTING SAFE DRINKING WATER SUPPLY SYSTEMS ... TALUK ... UDUMBANCHOLA
(1) SPOT SOURCES -WP (R) SPS

DISTRICT : IDUKKI
Page No. : 20
Run Date : 27/07/93

STATE CODE	DIST. CODE	BLOCK CODE	PANC. CODE	VILL. CODE	SL. No.	HABITATION NAME	TYPE OF SYSTEM	DATE OF COMMISSIONING	DESIGN POPULATION	DESIGN YEAR	DESIGN QTY. (kld)	NO. INSTALLED WORKING	NO. INSTALLED DEFUNCT	YIELD (lpm) MAX.	YIELD (lpm) MIN.	
SC	DC	BC	PC	VC	SL		23	34	35	36	37	29	30	40	41	
12	9	7	2	19	1	WARD I(PART)	10	01/01/89	250	2009	0	0	1	60.00	15.00	VANDANMEDU
12	9	7	2	19	2	WARD II(PART)	0	/ /	0	10	0	0	0	0.00	0.00	
12	9	7	2	19	3	WARD VI (PART)	0	/ /	0	0	0	0	0	0.00	0.00	
12	9	7	2	19	4	WARD VIII(PART)	0	/ /	0	0	0	0	0	0.00	0.00	
12	9	7	2	19	5	WARD IX	0	/ /	0	0	0	0	0	0.00	0.00	
12	9	7	2	19	6	WARD X	10	01/01/89	250	2009	10	0	1	60.00	15.00	
	VANDANMEDU					TOTAL			500		10	0	2	120.00	30.00	
12	9	7	2	20	1	WARD I(PART)	0	/ /	0	0	0	0	0	0.00	0.00	ANAKKARA
12	9	7	2	20	2	WARD II	10	01/01/84	250	2004	10	1	0	60.00	15.00	
12	9	7	2	20	3	WARD III	0	/ /	0	0	0	0	0	0.00	0.00	
12	9	7	2	20	4	WARD IV (PART)	0	/ /	0	0	0	0	0	0.00	0.00	
12	9	7	2	20	5	WARD III (PART)	0	/ /	0	0	0	0	0	0.00	0.00	
12	9	7	2	20	6	WARD I(PART)	0	/ /	0	0	0	0	0	0.00	0.00	
12	9	7	2	20	7	WARD II	0	/ /	0	0	0	0	0	0.00	0.00	
12	9	7	2	20	8	WARD II (PART)	0	/ /	0	0	0	0	0	0.00	0.00	
12	9	7	2	20	9	WARD IV	0	/ /	0	0	0	0	0	0.00	0.00	
12	9	7	2	20	10	WARD VII (PART)	0	/ /	0	0	0	0	0	0.00	0.00	
12	9	7	2	20	11	WARD V	0	/ /	0	0	0	0	0	0.00	0.00	

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DESIGN CALCULATIONS

Annexure I	–	Population forecast and water demand.
Annexure II	–	Design of Pumping main and pumpsets.
Annexure III	–	Design of service reservoirs.
Annexure IV	–	Design of Treatment Unit.
Annexure V	–	Hydraulic design of distribution net work.

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Accelerated Rural Water Supply Scheme to Vandanmedu and Anakkara Villa

In Idukki District

Design Calculations

Annexure I

Population forecast & Water demand

Vandanmedu Village is now bifurcated into two villages namely, Vand and Anakkara.

Population as per 1991 census

Vandanmedu Village	= 8,574
Anakkara Village	= 21,474
	= 30,048
Population in 1998	= 30,048×1.49
	= 34,525
Population in 2008	= 34,525×1.219
	= 42,086
Population benefitted by the existing scheme (RWSS to Puliyanmala	= 3,000
Design population in 2008 after deducting benefitted population	= 42086 - 3000
	= 39086 Say 39
Water demand @ 40 lpcd	= 39000×40=1.5 / 106
Population in 2018	= 34,525×1.486
	= 51,304

485/2025.

Design population in 2018 after deducting benefitted population. = 51,304 - 3000

= 48,304 say 48,250

Water demand @ 40 lpcd = $\frac{48,250 \times 40}{10^6}$

= 1.93 mld

Zone wise population and water demand

Zone	Population in 2018	Water demand in MLD	No: of taps
Zone I	33193 say 33250	1.33	133
Zone II	7480 Say 7,500	0.30	30
Zone III	6078 Say 6,000	0.24	24
Zone IV (Existing)	1500	0.06	6
Total	48,250	1.93 mld	193 taps

ANNEXURE II

Design of Raw water pumping main and pumsets

Ultimate water demand including 5% wastage = 1.93x1.05 = 1.9965mld

16 Hours of pumping = $\frac{1.9965 \times 10^6}{16 \times 60 \times 60}$ = 34.18 lps

Rate of Pumping or 2.95 mld

Assuming velocity as 1m/sec

Diameter require $\sqrt{\frac{34.18}{0.000785}}$ = 208.66

Say 210mm

Hence economic size may be worked out among 200, 250 & 300mm pipes

Static head:

Inlet level of slow sand filter	= + 1161.000
O/L of pumsets	= + 1054.500
F.V.L.	= + 1045.75
Suction head	= 1054.5 - 1045.75 = 8.75m
Static head including 1m residual head	= 1161 - 1045.75 + 1
	= 116.25m
Length of pumping main	= 2950
H.P. required assuming 60% efficiency	= $\frac{W_w \times 100 \times H}{75 \times 60}$
	= 0.76 H HP
KW required @ 0.735KW/HP	= 0.76×0.735
	= 0.5591 Kw
Annual cost of electrical energy @ Rs. 1.0/unit	= 0.5590 x 16 x 365.25 x 1.0
	= 3266.8Rs

Capitalisation of energy charges:

No. of years (n)	= 20
Interest rate (r)	= 10%
Capitalised cost (C)	= $C_R \frac{(1-(1+r)^{-n})}{r}$ = $8.514C_R$

ECONOMIC DESIGN OF RAW WATER PUMPING MAIN

Rate of Pumping = 34.18 lps or 2.95 mld

Length of Pumping main = 2960m

Diameter of pipe in mm	Frictional loss in m per 1000m	Actual loss	Minor loss	Total loss	Static head in mts.	Total head in mts	Class of pipe	Rate/m length of pipe	Cost of pipe in lakhs	H.P. required assuming 100% standbye 0.76 Hx2	cost of pump set @ Rs.9,000/- HP in lakhs	Annual cost of elec. energy charges in lakhs 3266.8 H
1	2	3	4	5	6	7	8	9	10	11	12	13
200 CI	10.29	30.46	3.05	33.51	116.25	149.76 Say 150m		Not done due to high pressure.				
250 CI	3.47	10.27	1.03	11.3	116.25	127.55 Say 128m		Not done due to high pressure				
300 CI	1.43	4.23	0.42	4.65	116.25	120.9 Say 121	CI-B	1067.89	31.60	91.96x2 Say 100x2	18.0	3.95
350 CI	0.67	1.98	0.2	2.10	116.25	118.43 Say 119	CI-B	1422.69	42.11	90.44x2 Say 100x2	18.0	3.89

Calculation for Water Hammer

300mm CI, Cl -B- Pipe

$H_{max} = \frac{a\ V_o}{g}$

$a = \frac{1425}{\sqrt{1 + \frac{K}{E}\frac{d}{c}}}$; $V_o = 4.56 \times 10^{-3} \times \kappa \times d^{0.63} \times S^{0.54}$

$\frac{K}{E}$ = 0.027, d = 0.3, t = 0.013m

$a = \frac{1425}{\sqrt{1+\frac{0.027 \times 0.3}{0.013}}} = 1118.52m/Sec.$

$V_o = 4.567 \times 10^{-3} \times 100\ (300)^{0.63}\ \frac{(1.43)^{0.54}}{1000}$

$= 0.48m/sec.$

$H_{max} = \frac{a\ V_o}{g} = \frac{1118.25 \times 0.48}{9.81} = 54.73m$

Total max: pressure $H + H_{max} = 121 + 54.73 = 175.73 \angle 250m$

which is the suggest max: Hydrostatic site test pr.

Thus 300mm CI , class -B pipe can be used for pumping main with surge tank, since the total max: pressure is greater than the suggested max: working pressure, (inclusive of surge) is 160m

Total head to be resisted to pump
thro' pipe or 2.95 mld through 300mm
dia-pipe = 121m

HP required assuming 60% efficiency $= \frac{34.18 \times 121 \times 100}{75 \times 60}$

$= 91.9$ say 100 HP

To provide 2 nos. 100HP turbine pumpset
(1 being standbys.

[illegible] WATER PUMPING MAIN FROM SUMP T1 TO TANK T2 & T3

Length of pumping main = 5050m

Rate of pumping = 9.375 lps or 0.81 mld

Sl. no.	Size of pipe in mm	Friction loss Per 1000m	Friction loss Actual loss	Friction loss Minor loss	Friction loss Total loss	Friction loss through 80mm GI pipe (S470) including minor loss in mts.	Static head in mts	Total head in 'H'	Class of pipes	Rate/m length of pipe	Cost of pipeset in lakhs	HP required assuming 100% standbye 0.208 Hx2
1	2	3	4	5	6	7	8	9	10	11	12	13
1	100	27.49	138.82	13.88	152.7	69.28	71.77	293.75 Say 294		Not done due to high pressure.		
2.	125	9.27	46.81	4.68	51.49	69.28	71.77	192.54 Say 193	GI-Med	325	16.41	40.14x2 Say 45x2
3.	150	3.82	19.29	1.93	21.22	69.28	71.77	162.27 Say 163	GI-Med	390	19.70	33.9x2 Say 35x2

Since the length of pumping main is 5050m, which is quite large due to practical consideration and the difference in cost being negligible 150mm pumping main is to be adopted.

Sd/-

Executive Engineer

Design of clear water pumping main from sump T1 to G.L. tank at T2 & T3

Ultimate water demand = 0.3 + 0.24 = 0.54mld

Hours of pumping = 16

Rate of pumping = $\frac{0.54 \times 10^6}{16 \times 60 \times 60}$

= 9.375 lps or 0.81 mld

Assuming velocity as 1 m/sec.

Dia = $\sqrt{\frac{9.375}{V\ 0.000785}}$ = 109.28 say 125mm

Economic size can be worked out among 100, 125 & 150mm GI pipes.

Static head

T.V.L. = + 1155.500

Next ground level is at D from the Jn (B (Schematic diagram) = + 1226.270

Static including Jn residual head = 1226.27 - 1155.5 + 1 = 71.77m

Common length of pumping main = 5050m

HP required assuming 60% efficiency = $\frac{9.375 \times 100 \times H}{75 \times 60}$

= 0.208H HP

Kw required = 0.208x0.735 H = 0.153H Kw

Annual cost of electrical energy = 0.153H x 16x365x1.10

@ Rs. 1.10/unit = 984.13H = Ce

Capitalisation of energy charges

Capitalised cost (Cc) = 8.514 C R

Annual cost of ele. energy charges in lakhs $0.894 C_R$	Energy charges capitalised in lakhs $0.514 C_R$	Grand total in lakhs	Remarks
15	16	17	18
1.73	14.73	34.74	125mm C.I. medium Is economical
1.16	12.43	34.93	

Max: Friction loss in the branch line

Max: Friction loss occure in the Branch line to T3

Ultimate water demand of T3 = 0.24mld

Rate of pumping = $\frac{0.24 \times 10^6}{16 \times 60 \times 60}$ = 4.17 lps, or 0.36

Assuming 1m/sec. velocity diameter = $\sqrt{\frac{4.17}{0.000785}}$ = 72.88 say 80mm

If 80mm GI pipe is adopted

friction loss/1000mm = 18.15m

Total friction loss in 3470m of length of branch line upto the bump point (+1226.270) from Hump point water will flow by gravity to the inlet tank T3(+1195.5)

Total friction loss = 18.15x3.47x1.1 = 69.28m

Calculation for water Hammer

150mm GI (Med.) pipe.

$H_{max} = \frac{a \, Vo}{g}$

$a = \frac{1425}{\sqrt{1 + \frac{K}{E} \times \frac{d}{t}}}$ $\quad Vo = 4.567 \times 10^{-3} \times c \, (d)^{0.63}$

$\frac{K}{E}$ = 0.0098,, d = 0.15, t = 0.0045

$a = \frac{1425}{\sqrt{1 + 0.0098 \times \frac{0.15}{0.0045}}} = 1248.32 m/sec.$

$Vo = 4.567 \times 10^{-3} \times 100 (150)^{0.63} \frac{(3.82)}{1000}^{0.5}$

= 0.53m/sec.

$H_{Max} = \frac{a \, Vo}{g} = \frac{1248.32 \times 0.53}{9.81}$ = 67

Total max: Pressure = H + Hmax = 163+67.44 = 230.44 < 250m

Which is the internal design pr. of GI pipe

So 150mm GI (Med) pipe can be adopted for pumping main with out surge arrestors since the total maximum pressure is less than internal design pressure of GI pipe.

Pumpsets

Total head to be resisted to pump 9.375 lps or 0.81 mld through 150mm GI medium pipe= 163m

HP requid = $\frac{9.375 \times 163 \times 100}{75 \times 60}$ = 33.96

=Say 35 HP

Provide 2 nos. 35 HP pumpsets one being standbye

Checking the Water Hammer For the branch line of 80mm GI to Tank T3 for 80mm GI to Tank T3.

For 80mm GI (Med) pipe

t = 0.00405m

e = 1425

$= \sqrt{\frac{1 \times 0.0098 \times 0.08}{0.00405}}$ = 1304.33m/sec

Vo = $4.567 \times 10^{-3} \times 100 (80)^{0.63} \frac{(18.15)^{0.5}}{100}$

= 0.83m/sec

H max. = $\frac{a\ Vo}{g}$ = $\frac{1304.33 \times 0.83}{9.81}$ = 110.36

Total max : Pressure = H + Hmax = 163+ 110.36 = 273.36 < 600m

So OK

Checking the water hammer at sag point + 1090.320

Max. G.L.	= + 1226.270
G.L. at sag point	= + 1090.320
Static head	= 1226.270 − 1090.320
	= 135.95m < 163m which is the working pressure of the pumping main. So OK.

ANNEXURE III

DESIGN OF SUMP AND G.L. TANKS

1.

1. Design of sump near filter unit

Capacity of the slow sand filter	= 2.954 mld
Water demand for Zone I in 2008	= $\frac{1.33 \times 1.219}{1.486}$ = 1.09 mld
Capacity of sump	= 12 hour storage for zone I and 1 hr storage of sump.
	= $\frac{1.09 \times 10^6 \times 12}{24}$ + $\frac{2.954 \times 10^6 \times 1}{24}$
	= 5,45,000 + 1,23,083
	= 6,68,083 Say 6.67 lakh litres.

2. Design of G.L. tank T2

Intermediate stage (2008)

	= $\frac{0.3 \times 1.219}{1.486}$
Water demand for Zone II	= 0.25mld
Capacity required for 12 hour storage	= $\frac{0.25 \times 10^6 \times 12}{24}$
	= 1.25 lakhs litres

3. Design of G.L. tank T3

Intermediate stage (2008)

Water demand for Zone III = $\frac{0.24}{1.466} \times 1.219$

= 0.2 mld

Capacity required for 12 hour storage = $\frac{0.2 \times 10^6 \times 12}{24}$

= 1.0 lakh litres.

Ultimate storage (2018)

Water demand for Zone III = 0.24 mld

Capacity required for12 hr. storage = $\frac{0.24 \times 10^6 \times 12}{24}$

= 1.2 lakh litres.

Since the difference in capacity for intermediate demand and ul demand is only 20,000, it is better to provide for the ultimate stag

4. Design of G.L. tank T4 (Existing)

Since the existing tank capacity is only 30,000 litres, the capaci worked out for an ultimate stage.

Water demand in 2018 = 0.06 mld

Capacity required for 12 hour storage = $\frac{0.06 \times 10^6 \times 12}{24}$

= 30,000 litres

So OK

ANNEXURE IV

DESIGN OF TREATMENT UNIT

Design of slow sand filter

Since difference between the intermediate water demand and ultimate demand is less than 1 mld, the slow sand filter is designed for ultimate stage.

Ultimate water demand including 25% wastage = 1.969 mld

Hence capacity required = 1.969x1.5

= 2.954 mld

Assuming rate of filteration is 150l/m2/hr

Area required = $\frac{2.954 \times 10^6}{16 \times 150}$

= 1230.83 m2

Providing 7 units required area of each unit = $\frac{1230.83}{7}$

= 175.71 Say 180 m2

Hence provide filter, 8 units one being standbye, each of size 12x15m

Design of sedimentation tank

Ultimate water demand in 2018 including 25% wastage = 1.93 X 1.02

Assuming 16 hours operation/day = 1.969 mld

Capacity of units = $\frac{1.969 \times 24}{16}$ = 2.954 mld

Adopting a detention time of 3½ hours as per para 6.5.3 of water Manual:

Capacity required for sedimentation basin $= \frac{2.954 \times 3.5}{24}$

$= 0.43\ ML$

Adopting a water depth of 3m

Area required $= \frac{0.43 \times 10^6}{10^3 \times 3} = 143.33m$ Say

Adopting a ratio of L:B 4:1

Provide 2 nos. rectangular sedimentation basin of size 18 x 4.5 x

[illegible] OF DISTRIBUTION SYSTEM.

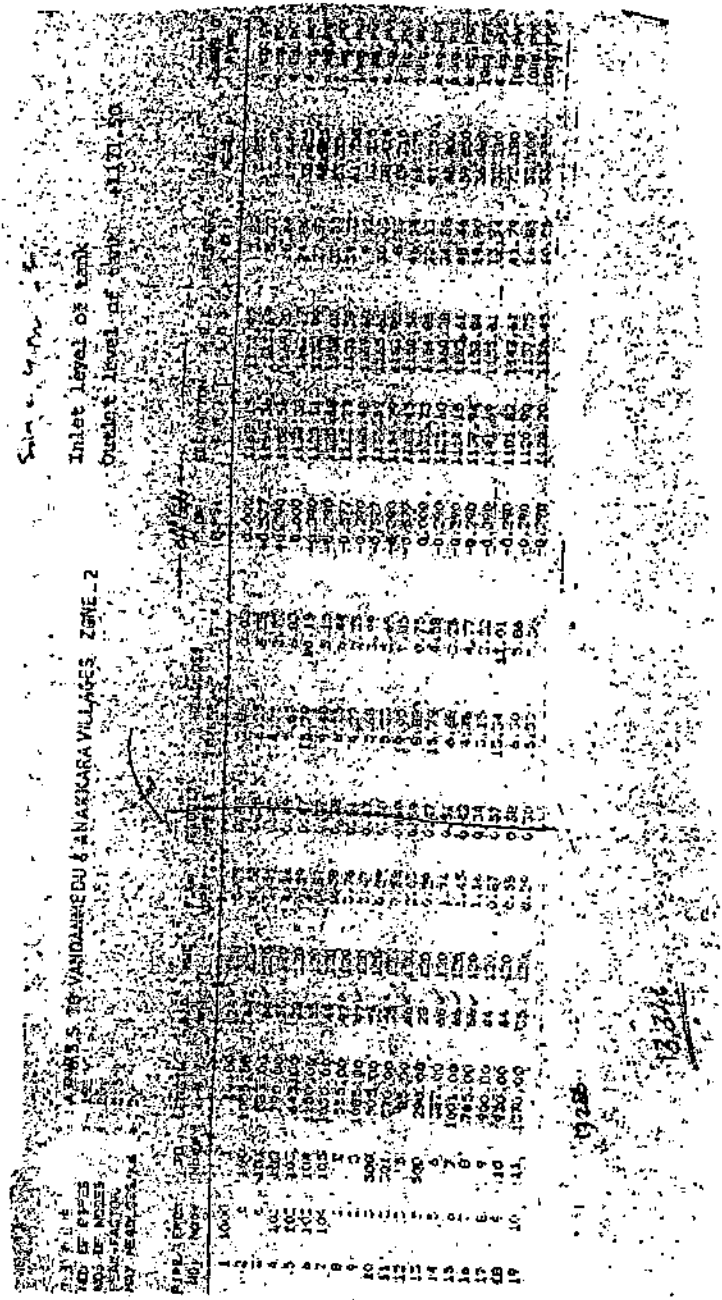
[illegible]AKKARA VILLAGES. ZONE.1

Inlet level of tank

Outlet level of tank : +1155.00

PIPE NO.	FROM NODE	TO NODE	LENGTH (M)	DIA (MM)	HWC	FLOW (LPS)	HEADLOSS (M/KM)	HL (M)	offtake FLOW (LPS)	ELEVATION (M)	H G L (M)	PRESSURE (M)	STATIC HEAD	CLASS OF PIPE
1	[illegible]	[illegible]	[illegible]	[illegible]	120	[illegible]	[illegible]	[illegible]	[illegible]	1095.[illegible]	[illegible]	65.28	68.040	CL-15,AC
2	[illegible]	[illegible]	[illegible]	[illegible]	120	[illegible]	[illegible]	2.03	[illegible]	1065.[illegible]	1155.12	89.44	[illegible]	CL-15,AC
3	[illegible]	[illegible]	[illegible]	[illegible]	120	[illegible]	[illegible]	0.09	[illegible]	1088.[illegible]	1154.91	[illegible]	71.[illegible]	10kg,PVC
4	3	300	850.00	29	120	0.29	[illegible]	1.24	[illegible]	1136.44	1152.02	[illegible]	41.560	10kg,PVC
5	[illegible]	[illegible]	155.00	[illegible]	120	4.76	[illegible]	[illegible]	0.000	[illegible]	1154.71	71.20	74.490	10kg,PVC
6	4	400	1185.00	28	120	0.29	15.[illegible]	15.?1	-0.290	1107.[illegible]	1138.00	[illegible]	50.860	10kg,PVC
7	4	5	670.00	124	120	7.47	[illegible]	[illegible]	0.000	1074.[illegible]	1153.77	79.29	83.620	10kg,PVC
8	5	500	1039.00	29	120	0.29	15.[illegible]	[illegible]	-0.290	[illegible]	[illegible]	[illegible]	34.090	10kg,PVC
9	5	6	405.[illegible]	124	120	[illegible]	[illegible]	[illegible]	0.000	1059.[illegible]	1152.55	[illegible]	91.?80	10kg,PVC
10	6	600	[illegible]	[illegible]	100	[illegible]	[illegible]	[illegible]	[illegible]	1044.[illegible]	1148.02	[illegible]	[illegible]	GI-Medium
11	600	601	655.[illegible]	[illegible]	[illegible]	9.[illegible]	[illegible]	[illegible]	-0.290	1072.[illegible]	1128.07	[illegible]	85.200	GI-Medium
12	601	602	[illegible]	[illegible]	120	0.29	[illegible]	8.28	-0.290	[illegible]	1119.78	40.80	79.020	10kg,PVC
13	601	603	390.00	28	120	0.29	15.[illegible]	6.16	-0.290	1102.08	1121.91	19.85	5?.925	10kg,PVC
14	6	7	[illegible]	100	100	2.02	[illegible]	[illegible]	[illegible]	1112.02	[illegible]	40.09	[illegible]	GI-Medium
15	7	8	930.00	79	120	1.75	[illegible]	[illegible]	-0.577	1068.56	1149.[illegible]	80.97	89.425	10kg,PVC
16	8	9	[illegible]	66	120	1.16	[illegible]	5.45	-0.290	[illegible]	1147.09	[illegible]	14.755	10kg,PVC
17	9	10	845.00	55	120	0.87	[illegible]	2.78	-0.290	1136.82	1145.[illegible]	[illegible]	31.180	6 kg,PVC
18	[illegible]	[illegible]	1165.00	44	120	0.58	[illegible]	[illegible]	[illegible]	1083.0[illegible]	[illegible]	[illegible]	[illegible]	10kg,PVC
19	[illegible]	11	775.00	124	120	4.58	[illegible]	[illegible]	[illegible]	1126.4[illegible]	[illegible]	27.01	51.?90	10kg,PVC
20	12	13	545.00	124	120	4.58	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7?.545	10kg,PVC
21	12	120	164.00	28	120	[illegible]	[illegible]	[illegible]	[illegible]	1150.[illegible]	1151.67	1.67	8.000	10kg,PVC
22	[illegible]	14	1095.00	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	62.8[illegible]	72.885	10kg,PVC
23	14	140	1230.00	66	120	1.44	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10kg,PVC
24	140	141	[illegible]	[illegible]	120	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1137.56	[illegible]	[illegible]	6 kg,PVC
25	[illegible]	142	1002.00	66	120	1.7?	[illegible]	[illegible]	-0.577	[illegible]	[illegible]	15.70	[illegible]	10kg,PVC
26	142	143	925.00	66	120	1.15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-45.74	65.270	10kg,PVC
27	143	144	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	57.060	10kg,PVC
28	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.577	1108.85	[illegible]	[illegible]	49.145	CL-15,AC
29	15	16	220.00	[illegible]	120	5.18	[illegible]	1.87	-0.290	1109.84	1150.55	40.70	48.155	6 kg,PVC
30	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.290	[illegible]	[illegible]	[illegible]	[illegible]	6 kg,PVC
31	160	[illegible]	[illegible]	[illegible]	120	[illegible]	[illegible]	[illegible]	[illegible]	1104.[illegible]	[illegible]	[illegible]	53.176	10kg,PVC
32	[illegible]	[illegible]	[illegible]	[illegible]	120	[illegible]	[illegible]	[illegible]	0.000	[illegible]	1136.[illegible]	[illegible]	67.680	10kg,PVC
33	[illegible]	170	[illegible]	[illegible]	120	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10kg,PVC
34	17	18	915.00	55	120	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10kg,PVC
35	18	180	970.00	[illegible]	120	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10kg,PVC
36	18	181	546.00	44	120	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
37	181	182	725.00	28	120	0.29	[illegible]	11.61	[illegible]	1107.16	[illegible]	18.12	50.840	6 kg,PVC
38	15	19	790.00	200	120	14.47	[illegible]	[illegible]	0.000	1116.44	1151.22	34.78	[illegible]	CL-10,AC
39	19	190	200.00	28	120	0.29	[illegible]	[illegible]	[illegible]	[illegible]	1146.36	[illegible]	15.860	6 kg,PVC
40	19	20	380.00	200	120	14.19	1.46	0.56	0.000	[illegible]	1150.66	16.54	[illegible]	CL-10,AC
41	20	200	255.00	28	120	0.29	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	31.04	42.405	6 kg,PVC

PIPE NO.	FROM Node	TO Node	LENGTH (M)	DIA (MM)	HWC	FLOW (LPS)	HEADLOSS (M/KM)	HEADLOSS (M)	FLOW (LPS)	ELEVATION (M)	H G L (M)	PRESSURE (M)	STATIC HEAD	CLASS PIPE
42	20	21	570.00	200	120	13.89	1.41	1.82	0.000	1114.52	1150.14	35.62	43.480	CL-10,AC
43	21	22	255.00	97	120	3.18	3.12	0.74	0.000	1093.63	1147.51	54.28	59.370	6 kg,PVC
44	22	220	1210.00	66	120	1.74	6.86	5.06	-0.087	1088.64	1141.35	52.71	69.360	10kg,PVC
45	220	221	900.00	44	120	0.58	6.06	5.47	-0.290	1107.78	1133.68	25.90	48.220	10kg,PVC
46	221	222	740.00	28	120	0.29	15.75	11.65	-0.290	1090.43	1124.00	33.57	67.570	10kg,PVC
47	220	223	795.00	44	120	0.87	13.27	10.55	-0.577	1077.96	1130.80	52.84	80.035	10kg,PVC
48	223	224	780.00	28	120	0.29	5.72	4.15	-0.290	1100.62	1126.65	25.73	57.225	10kg,PVC
49	22	23	800.00	55	120	1.43	11.54	6.92	-0.600	1091.19	1142.49	51.29	66.810	10kg,PVC
50	23	24	1090.00	55	120	1.45	11.54	12.56	-0.290	1095.84	1125.90	31.06	59.150	10kg,PVC
51	24	240	1140.00	44	120	0.55	6.25	7.13	-0.577	1100.63	1122.76	22.10	57.225	6 kg,PVC
52	24	241	765.00	44	120	0.98	6.21	4.46	-0.290	1096.00	1125.46	29.42	62.920	10kg,PVC
53	241	242	410.00	28	120	0.29	15.75	7.87	-0.290	1093.14	1121.57	28.43	62.850	10kg,PVC
54	21	25	555.00	141	120	10.70	4.77	2.51	0.000	1099.19	1147.59	48.40	58.850	6 kg,PVC
55	25	26	565.00	124	120	4.92	2.02	1.29	0.000	1073.20	1146.56	73.36	82.770	10kg,PVC
56	26	27	1010.00	124	120	4.92	2.12	2.14	-0.290	1074.69	1144.06	69.36	82.005	10kg,PVC
57	27	28	805.00	124	120	4.63	1.29	1.31	-0.290	1109.10	1142.74	33.64	48.900	10kg,PVC
58	28	29	1000.00	124	120	4.34	1.68	1.68	-0.290	1118.16	1141.06	22.90	39.840	6 kg,PVC
59	29	30	150.00	97	120	4.05	4.33	0.75	0.000	1117.38	1140.32	22.74	40.485	6 kg,PVC
60	30	301	540.00	57	120	2.60	2.15	1.16	-0.577	1122.97	1139.17	16.20	33.030	6 kg,PVC
61	301	302	690.00	35	120	0.58	19.05	20.14	-0.577	1100.55	1126.02	25.47	55.450	6 kg,PVC
62	301	303	560.00	66	120	1.44	4.73	2.65	-0.577	1073.97	1136.51	60.54	82.035	10kg,PVC
63	303	304	870.00	35	120	0.87	9.45	7.98	-0.866	1109.41	1128.53	22.12	48.590	10kg,PVC
64	30	305	1050.00	66	120	1.45	4.73	4.99	-0.290	1104.20	1135.34	31.14	53.770	6 kg,PVC
65	305	306	1040.00	55	120	1.15	7.37	7.67	-1.158	1109.92	1127.74	18.75	49.080	6 kg,PVC
66	25	31	760.00	124	120	5.75	2.86	2.17	0.000	1120.56	1145.42	24.84	55.425	10kg,PVC
67	31	32	1250.00	124	120	5.79	2.82	3.26	0.000	1084.72	1142.16	57.43	73.275	10kg,PVC
68	32	33	740.00	124	120	5.79	2.82	2.12	0.000	1089.46	1140.04	51.58	68.535	10kg,PVC
69	33	34	860.00	124	120	5.79	[illegible]	2.48	0.000	1109.75	1138.56	28.83	48.270	10kg,PVC
70	34	340	480.00	29	120	0.29	15.75	7.11	-0.290	1100.25	1131.48	31.23	57.750	6 kg,PVC
71	34	35	800.00	124	120	5.50	2.60	2.17	0.000	1098.52	1136.45	37.93	59.480	6 kg,PVC
72	35	36	340.00	66	120	1.73	6.86	3.59	0.000	1095.63	1134.67	38.24	59.325	10kg,PVC
73	36	37	930.00	65	100	1.73	10.02	9.32	-0.290	1053.10	1125.45	72.44	104.895	GI-Medium
74	37	370	630.00	40	85	0.58	42.10HI	26.52	-0.577	1052.86	1099.02	45.23	104.205	GI-Medium
75	37	371	410.00	50	85	0.87	30.25HI	12.56	-0.868	1077.18	1115.19	38.01	80.825	GI-Medium
76	35	38	450.00	57	120	3.76	4.26	1.77	-0.290	1062.59	1134.68	72.29	95.610	10kg,PVC
77	38	39	1070.00	106	120	3.47	2.17	3.39	-0.290	1046.17	1132.27	86.10	111.850	CL-20,AC
78	39	40	1095.00	80	120	3.18	7.94	8.75	-0.290	1092.02	1123.54	31.52	65.925	CL-20,AC
79	40	41	1100.00	79	120	2.89	7.22	7.87	-0.290	1086.36	1115.71	29.34	71.635	10kg,PVC
80	41	42	285.00	79	100	2.60	5.86	1.67	-0.290	1066.89	1114.04	47.15	91.110	10kg,PVC
81	42	420	735.00	50	85	0.58	14.26	10.44	-0.577	1040.01	1103.60	63.59	117.995	GI-Medium
82	42	43	840.00	65	100	1.73	10.02	8.42	0.000	1041.52	1105.62	64.10	116.480	GI-Medium
83	43	430	425.00	32	85	0.29	34.90HI	14.83	-0.290	1073.65	1090.79	17.14	84.350	GI-Medium
84	43	44	630.00	65	100	1.44	7.14	4.50	-0.577	1074.00	1101.12	27.12	84.000	GI-Medium
85	44	440	350.00	35	120	0.87	40.44HI	14.16	-0.868	1066.00	1086.96	20.96	92.000	10kg,PVC



485/2025.

TITLE : A.R.W.S.S. TO VANDANMEDU & ANAKKARA VILLAGES. ZONE-3

NO. OF PIPES : 11

NO. OF NODES : 12

FEAL FACTOR : 2.5

MAX HEADLOSS/Km : 20

Outlet level of tank +1193.33

PIPE NO.	FROM Node	TO Node	LENGTH (M)	DIA (MM)	HWC	FLOW (LPS)	HEADLOSS (M/Km)	HEADLOSS (M)	off take FLOW (LPS)	ELEVATION (M)	H G L (M)	PRESSURE (M)	STATIC HEAD	CLASS OF PIPE
1	2000	1	10.00	124✓	120	4.91	2.11	[illegible]	0.000	1190.68	1193.48	2.80	2.170	4 kg.PVC
2	1	100	1198.00	55✓	120	1.15	[illegible]	[illegible]	-0.577	1145.51	1184.57	39.07	50.195	[illegible]
3	100	101	1105.00	[illegible]✓	120	0.58	19.05	[illegible]	-0.577	1136.07	1162.73	32.60	[illegible]	[illegible]
4	1	102	567.00	124✓	120	7.76	[illegible]	[illegible]	-0.290	1170.13	1192.73	[illegible]	[illegible]	4 kg.PVC
5	2	200	1026.00	35✓	120	0.58	19.05	19.55	-0.577	[illegible]	1173.20	[illegible]	72.940	10 kg.PVC
6	2	201	550.00	26✓	120	0.29	15.79	8.69	-0.290	1172.85	1184.06	[illegible]	[illegible]	[illegible]
7	2	3	1140.00	72✓	120	2.60	5.88	[illegible]	-0.577	1115.68	1188.08	[illegible]	81.825	10 kg.PVC
8	3	4	780.00	80✓	120	2.02	5.48	[illegible]	-0.290	1072.43	1183.39	110.96	120.075	CL-20.AC.
9	4	5	1035.00	65✓	100	1.73	9.99	10.34	-0.577	1018.38	1173.05	154.67	177.125	GI-Medium
10	5	6	1020.00	65✓	100	1.15	4.72	4.82	-0.577	1082.98	1168.23	86.24	113.515	GI-Medium
11	6	7	885.00	50	55	0.58	14.20	12.57	-0.577	1124.68	1155.66	30.98	70.815	GI-Medium

9,346

4346

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PART-I

MAINTENANCE ESTIMATE

I.	Operating Charges		
	a) 2x2	Operators for 15 months @ ₹. 1600/month	- ₹. 96,000/-
	b) 2x2	Shift assistance for 15 months @ ₹. 1510/month	- ₹. 90,600/-
II.	72 days off duty wages		
	a)	72 days x 4 Operators @ ₹.50/day	- ₹. 14,400/-
	b)	72 days x 4 Shift assistant @ ₹.50/day	- ₹. 14,400/-
III.	Cost of Uniform with washing allowance		
	8x2 sets @ ₹. 325/set		- ₹. 5,200/-
IV.	T.A & D.A.		- ₹. 20,000/-
	Unforseen if any		- ₹. 2,400/-
			= 2,43,000/-

PART - II

GENERAL MAINTENANCE CHARGE

1.	Annual cost of energy @ Rs. 0.80/Unit (16x365.25x0.746x0.8x135)	- Rs. 4,70,63
2.	Repairs to pump sets including cost of spare parts	- Rs. 34,50
3.	Repairs to pipe lines	- Rs. 19,500
4.	Annual maintenance of pump house Reservoirs & treatment plants	- Rs. 17,500
5.	Cost of chemicals	- Rs. 50,000
6.	Telephone charges	- Rs. 5,000
	Unforeseen if any	- Rs. 1,161
		- Rs. 5,98,000
	Annual maintenance charge (2,43,000 + 5,98,000)	- Rs. 8,41,000
	Hence production cost of 1000 lit. of water	- Rs. 8,41,000x1 365.25x1.93
		= 1.19/1000 lit

DETAILED ESTIMATE

General Abstract			Rs. in lakhs
Part I	– Cost of Intake works	–	11.00
Part II	– Cost of Treatment unit	–	61.24
Part III	– Cost of service reservoirs and sumps.	–	19.55
Part IV	– Cost of pumping main and pump sets.	–	218.20
Part V	– Cost of distribution system	–	204.00
Part VI	– Cost of transformers and power line.	–	2.45
			516.44
	2½% contingency	–	12.56
		–	529.00

(Rs. Five hundred and twenty nine lakhs)

EXECUTIVE ENGINEER
KERALA WATER AUTHORITY
COCHIN-18

Chief Engineer
(Deputy Chief E[illegible]ge)

PART - I

COST OF INTAKE WORKS

1.	Cost of intakes well cum pumphouse	L.S.	: 6.50 Lakh
2.	Cost of construction of weir of 5m. hight across the river	L.S.	: 5.50
			: 11.00 Lakhs

PART - II

COST OF TREATMENT UNIT

1.	Cost of treatment unit consisting of slow sand filter sedimenation tank etc. of capacity 2.954 mld @ Rs. 10 lakhs/mld.	: Rs. 59,00,000/-
2.	Chlorinator 2 Nos. @ Rs. 50,000/E.	: Rs. 1,00,000/-
	Unforseen if any	: Rs. 1,16,900/-
		: Rs. 61,24,900/-

PART - III

COST OF SERVICE RESERVOIRS & SUMP

1.	Sump T_1 of capacity 6.89 lakh litres @ Rs. 2.00/lit.	: Rs. 13,38,000/-
2.	G.L. Tank T_2 of capacity 1.25 lakhs litres @ Rs. 2.5/litres	: Rs. 3,12,500
3.	G.L. Tank T_3 of capacity 1.20 lakhs litre @ Rs. 2.5/litres	: Rs. 3,00,000/-
	Total	: Rs. 19,50,500/-
	Unforseen if any	: Rs. 4,500/-
	Grand Total	: Rs. 19,55,000/-

PART - IV

COST OF PUMPSETS AND PUMPING MAIN

A.	Raw water pumping main	: Rs.	70,20,000/-
B.	Clear water pumping main	: Rs.	1,48,00,000/-
	Totals	: Rs.	2,18,20,000/-

Work Tendered – 83 – w labbs. A. COST OF RAW WATER PUMPING MAIN

Retender – 143 A.1. Cost of pipes and specials.
Single Tender

1. Cost of 300mm CI cl.B medium pipe of length 2960m @ Rs. 1,06,789/100m		: Rs.	31,60,954/-
2. Add 5% for wastage		: Rs.	1,58,048/-
3. Add 15% for specials		: Rs.	4,74,143/-
4. Cost of sluice valve	L.S.	: Rs.	7,500/-
5. Conveyance of pipes	L.S.	: Rs.	18,000/-
Totals		: Rs.	38,18,644/-

Say Rs. 38.19 lakhs

A.2 Working charges

1. Earth work excavation for all classes of soil to lay 300mm CI medium pipe of length 2960m @ 108m3/100m = 3197 m³

a) -do- -do- ordinary soil 10% 320m3 @ Rs. 308.96/10m3	: Rs.	[illegible],887/-
b) -do- -do- Hard soil 50% 1598m3 @ Rs. 411.63/10m3.	: Rs.	[illegible],778/-
c) -do- -do- ordinary rock 10% 320m3 @ Rs. 1080.21/10m3	: Rs.	[illegible],570/-
d) -do- -do- Hard rock 30% 959m3 @ Rs. 3447.50/10m3	: Rs.	3,32,615/-
2. Laying 300mm CI cl.B. pipe including specials and fittings, lowering into trenches etc. complete 2960m @ Rs. 2068.10/10m.	: Rs.	6,12,278/-

3.	Jointing and testing 300mm CI pipe line with water to the required test pressure -2960m @ Rs. 2380.56/150m	: Rs. 47,153/-
4.	Conveying 30mm sluice valve & placing in position and fixing etc. complete	: Rs. 800/-
5.	Construction of valve chambers 2 Nos. @ Rs. 7000/E.	: Rs. 14,000/-
6.	Cost for providing surge arrestors L.S.	: Rs.1,50,000/-
7.	Road restoration charges L.S.	: 85,927/-
		: Rs.13,50,000/-

A3 Cost of pumpsets

1.	Cost of pumpsets 2 Nos. 100HP turbine pumpsets @ Rs.9000/HP	: 18,00,000/-
2.	Erection charges	: 50,000/-
	Totals	-Rs.18,50,000/-

Abstract

A1	Cost of materials	: Rs. 38,19,000/-
A2	Working charges	: Rs. 13,50,000/-
A3	Cost of pumsets	: Rs. 18,50,000/-
	Unforseen items if any	: Rs. 1,000/-
	Totals	: Rs. 7020,000/-

B. CLEAR WATER PUMPING FROM SUMP T1 To G.L. TANK AT T2 & T3

B.1 Cost of materials

1.	Cost of 150mm GI medium pipe of length 5050m @ Rs. 39000/100m	: Rs.	19,69,500/
2.	Cost of 80mm GI medium pipe of length 5455m @ Rs. 16966/100m	: Rs.	9,25,495/
3.	Add 5% for wastage	: Rs.	1,44,750/
4.	Add 15% for special & fittings	: Rs.	4,34,249/
5.	Cost of 150mm valves 4 Nos. @ Rs. 2000/E	: Rs.	8,000/
6.	Cost of 80mm valves 5 Nos. @ Rs.1000/E	: Rs.	5,000/
7.	Conveyance of pipes L.S.	: Rs.	15,000/
	Totals	: Rs.	35,01,994/

Say 35.02 lakhs

B.2. Working charges

1. a.	Earthwork excavation in all classes of soil to lay pipes. 150 mm GI 5050m @ 69.5 m³/100m = 35098 m³ 80 mm GI 5455m @ 66 m³/100 m = 36003 m³ -do- ordinary soil 10% 7110m3 @ Rs. 308.96/10m3	: Rs.	2,19,671/
b.	-do- Hard soil 50% 35550m3 @ Rs. 411.63/10m3	: Rs.	14,63,345/
c.	-do- -do- Ordinary rock 10% 7110m3 @ Rs. 1080.31/10m3	: Rs.	7,68,100/
d.	-do- -do- hard rock 30% 21330m3 @ Rs. 3447.50/10m3	: Rs.	73,53,51[illegible]
2. a.	Supplying, threading, laying, fitting & jointing 150mm GI medium pipe of length 5050m @ Rs. 851.59/10m	: Rs.	4,30,[illegible]
b.	-do- -do- 80mm GI -do- 5455m @ Rs. 468.00/10m	: Rs.	2,55,[illegible]
3. a)	Testing the 150mm GI pipe line with water to the required test pressure. 5050m @ Rs. 536.70/150m.	: Rs.	[illegible]

b.	-do- -do- 80mm pipe line -do- -do- 5455m @ Rs. 172.44/150m		: Rs.	13,544/-
4.	Cost of providing surge arrestors	L.S.	: Rs.	1,50,000/-
5.	Conveying 150mm sluice valve, placing in position and fixing 4 nos. @ Rs. 250.00/Each		: Rs.	1,000/-
6.	Conveying 80mm sluice valve, placing in position and fixing 5 nos. @ Rs. 150.00/E.		: Rs.	750/-
7.	Construction of valve chamber 9 Nos. @ Rs. 1000/E.		: Rs.	9,000/-
8.	Road restoration charges	L.S.	: Rs.	2,50,656/-
			: Rs.	1,09,33,000/-

Say Rs. 109.33 lakhs.

8.3. Cost of pumpsets

1.	Cost of pumpset 2 Nos. 35 HP @ Rs. 4000/HP		: Rs.	2,80,000/-
2.	Erection charges	L.S.	: Rs.	40,000/-
	Total		: Rs.	3,20,000/-

8.4. Abstract

8.1	Cost of materials	: Rs.	35,02,000/-
8.2	Working charges	: Rs.	1,09,33,000/-
8.3	Cost of pumpsets	: Rs.	3,20,000/-
		: Rs.	1,47,55,000/-
	Unforseen items	: Rs.	45,000/-
		: Rs.	1,48,00,000/-

PART - IV

COST OF DISTRIBUTION SYSTEM

A. Cost of materials

Sl. No.	Size of pipe	Class of pipe	Length in mts.	Length including 5% wastage	Rate/m	Amount in Rupees.
1	2.	3	4.	5	6	7
1.	250mm AC	15 Kg.	175	184	527.32	97,027/-
2.	200mm AC	15 Kg	1274	1338	414.42	3,54,484/-
3.	200mm AC	10	1540	1617	298.41	4,82,513/-
4.	100mm Ac	20	1070	1124	160.03	1,79,874/-
5.	80mm Ac	20	1875	1969	108.80	2,14,227/-
6.	160mm PVC	6 Kg	535	562	222.40	1,24,989/-
7.	140mm PVC	10kg	8187	8596	278.00	23,89,688/-
8.	-do-	6 Kg	1050	1103	172.00	1,89,716/-
9.	-do-	4 Kg	587	616	115.80	71,313/-
10.	110mm PVC	10 Kg	1745	1832	103.40	1,89,429/-
11.	-do-	6 Kg	925	971	103.40	1,00,401/-
12.	-do-	4 Kg	1640	1722	73.00	1,25,706/-
13.	90mm PVC	10 Kg	3915	4111	116.80	4,76,876/-
14.	-do-	6 Kg	220	231	66.93	15,459/-
15.	75mm PVC	10Kg	8193	8603	69.24	5,95,672/-
16.	-do-	6 Kg	1472	1546	46.95	72,585/-
17.	-do-	4 Kg	1288	1356	34.34	46,559/-
18.	63mm PVC	10 Kg	2680	2814	48.48	1,36,423/-
19.	-do-	6 Kg	3348	3515	33.71	1,18,491/-
20.	-do-	4 Kg	1635	1717	21.98	37,740/-
21.	50mm PVC	10 Kg	7342	7709	30.05	2,31,655/-

22.	-do-	5 Kg	1805	2002	19.00	38,038/-
23.	-do-	Kg	1545	1822	17.00	27,574/-
24.	-40mm PVC	10 Kg	6021	6322	14.40	91,037/-
25.	-do-	5 Kg	1190	1250	10.76	13,450/-
26.	-do-	Kg	508	530	9.60	5,088/-
27.	32mm PVC	1 Kg	6134	6441	8.32	53,589/-
28.	-do-	5 Kg	2575	2704	8.20	22,173/-
29.	-do-	Kg	550	578	5.80	3,352/-
30.	100mmGI Medium	-	900	945	250.00	2,36,250/-
31.	65mmGI Medium	-	5625	5906	138.60	8,18,572/-
32.	50mmGI Mediuc	-	2688	2822	103.04	2,90,779/-
33.	40mmGI Mediuc	-	630	662	74.90	49,584/-
34.	32mmGI Mediuc	-	425	446	67.53	30,118/-
			81388m		Totals	81,30,446/-
	Add 15% for specials & fittings					12,19,567/-
	Cost of valves 45 Nos.			L.S.		50,000/-
	Conveyance charges			L.S.		99,987/-
			Grand Total			95,00,000/-

Say Rs. 95 lakhs

B. WORKING CHARGES

1. Earth work excavation in all classes of soil to lay pipes including excavation for sockets, dressing of sides, ramming of bottom etc. with lift upto 1.5m stacking the excavated earth not more than 50m clear from the edge of excavation and refilling the trenches after laying pipes in layers by watching, ramming etc. complete and disposing the surplus soil as directed.

i.	250mm AC pipe of length 175m @ 108m3/100m.	: 189 m3
ii.	200mm AC pipe of length 2814m @ 95.2m3/100m	: 2679 m3
iii.	100mm AC pipe of length 1070m @ 69.5m3/100m	: 744 m3
iv.	80mm AC pipe of length 1875m @ .66m3/100m	: 1238 m3
v.	160mmPVC pipe of length 535m @ 69.5m3/100m	: 372 m3
vi.	140mmPVC pipe of length 9824m @ 69.5m3/100m	: 6828 m3
vii.	110mmPVC pipe of length 4310m @ 69.5m3/100m	: 2996 m3
viii.	900mmPVC pipe of length 4135m @ .66m3/100m	: 2729 m3
ix	75mmPVC pipe of length 10953m @ .63m3/100m	: 6900 m3
x.	63mmPVC pipe of length 7663m @ 60m3/100m	: 4598 m3
xi.	50mmPVC pipe of length 10792m @ 55m3/100m	: 5936 m3
xii.	40mmPVC pipe of length 7716m @ 50m3/100m	: 3858 m3
xiii.	32mmPVC pipe of length 9259m @ 50m3/100m	: 4630 m3
xiv	100mm GI medium of length 900m @ 69.5m3/100m	: 626
xv.	65mm GI medium of length 5625m @ 60m3/100	: 3375
xvi.	50mm GI medium of length 2688m@ 55m3/100m	: 1478
xvii.	40mm GI medium of length 630m @ 50m3/100m	: 31
xviii.	32mm GI medium of length 425m @ 50m3/100m	: 2
		: 4

Say 50,000 m3

1.	a)	-do- -do- ordinary soil 10% 5000 m3 @ Rs. 308.96/10m3	: 1,54,480/-
	b)	-do- -do- Hard soil 50% 25000 m3 @ Rs. 411.63/10m3	: 10,29,075/-
	c)	-do- -do- ordinary rock 10% 5000m3 @ Rs. 1080.11/10m3	: 5,40,155/-
	d)	-do- -do- hard rock 30% 15000 m3 @ Rs. 3447.50/10m3	: 51,71,250/-
			: 68,94,960/-
2.	a)	Laying 250mm AC Cl.15 pipe of length 175m @ Rs. 1646.40/100m	: 2,881/-
	b)	-do- -do- 200mm AC Cl.15 pipe of length 1274m @ Rs. 1422.18/100m	: 18,119/-
	c)	-do- -do- 200mm AC Cl.10 pipe of length 1540m @ Rs. 1308.33/100m	: 20,148/-
	d)	-do- -do- 100mm AC Cl.20 pipe of length 1070m @ Rs. 975.98/100m	: 9,908/-
	e)	-do- -do- 80mm AC Cl.20 pipe of length 1875m @ Rs. 697.15/100m	: 13,072/-
			Rs. 64,128/-
	a)	Joining 250mm AC pipe laid to lines and levels in trenches using CI or any available type of joint after cleaning the ends, centering the pipes etc. complete.	
		50 Nos. joints @ Rs. 16.32/E	: Rs. 816/-
	b)	-do- -do- 200mm AC 100I 710 Nos joint @ Rs. 13.27/-	: Rs.9,422/-
	c)	-do- -do- 100mm AC 100I 275 Nos. joints @ Rs. 8.16/each	: Rs.2,244/-
	d)	-do- -do- 80mm AC -do- 475 nos. joint @ Rs. 6.64/Each	: Rs.3,154/-
			Rs 15,636/-

4. e) Testing the 250mm AC pipe line with water to the required test pressure.

175m @ Rs. 5.49/m : Rs.

b) -do- -do- 200mm AC pipeline -do- -do- 2814m @ Rs. 4.17/m : Rs. 11

c) -do- -do- 100mm AC pipe line -do- -do- 1070m @ Rs. 2.77/m : Rs. 2,

d) -do- -do- 80mm AC pipe line -do- -do- 1675m @ Rs. 2.48/m : Rs. 4,

: Rs. 20.

5. Laying, jointing and testing the PVC pipe lines

1. 160mm PVC of length 535m @ Rs. 8.79/m : Rs. 4,
2. 140mm PVC of length 9824m @ Rs. 8.37/m : Rs. 82,
3. 110mm PVC of length 4310m @ Rs. 7.94/m : Rs. 34,
4. 90mm PVC of length 4135m @ Rs. 7.35/m : Rs. 30,
5. 75mm PVC of length 10953m @ Rs. 6.20/m : Rs. 68,
6. 63mm PVC of length 7663m @ Rs. 5.39/m : Rs. 41,
7. 50mm PVC of length 10792m @ Rs. 4.88/m : Rs. 52,
8. 40mm PVC of length 7716m @ Rs. 4.72/m : Rs. 36,
9. 32mm PVC of length 9259m @ Rs. 4.33/m : Rs. 40,

Rs. 3,99,

6. a) Conveying, threading, laying, fitting and jointing 100mm GI medium pipes and specials.

900m @ Rs. 456.24/10m : Rs. 41,

b) -do- -do- 55mm GI medium of length 5625m @ Rs. 311.58/10m : 1,75,

c) -do- -do- 50mm GI -do- 2688m @ Rs. 283.85/10m : 76,

d) -do- -do- 40mm GI -do- 630m @ Rs. 223.33/10m		: Rs. 14,070/-
e) 32mm GI medium of length 425m @ Rs. 175.20/10m		: 7,446/-
		Rs. 3,14,133/-
Testing the 100mm GI pipe line with water to the required test pressure		
a) 900m @ Rs. 415.40/150m		: Rs. 2,493/-
b) -do- -do- 65mm GI -do- -do- -do- 5625m @ Rs. 338.33/150m		: Rs. 12,713/-
c) -do- -do- 50mm GI -do- 2688 @ Rs. 249.71/150m		: Rs. 4,462/-
d) -do- -do- 32mm GI -do- -425 @ Rs. 247.55/150m		: Rs. 701/-
e) -do- -do- 40mm GI -do- 630m @ Rs. 247.55/150m		: Rs. 1,040/-
		Rs. 21,409/-
Construction of street hydrants 193 Nos. @ Rs. 2500/E		: Rs. 4,82,500/-
Construction of valve chambers 45 Nos. @ Rs. 1000/E		Rs. 45,000/-
Road restoration charges	L.S.	: Rs.22,00,000/-
Fixing valves in position	L.S.	: Rs. 6,117/-
Total		= 104,55,000/-

ABSTRACT

COST OF DISTRIBUTION SYSTEM

Cost of materials	: Rs. 95,00,000/
Working charges	: 104,55,000/
Rehabilitation of distribution system in zone IV (W.S.S. to Vandanmedu)	: 2,45,000/
	: 202,00,000/
Unforseen if any	: 2,00,000/
	: 204,00,000/-

D A T A

1) Earth work excavation in ordinary soil for trenches to lay pipes including excavation for sockets and dressing of sides, ramming of bottom etc. with lift up to 1.5m, stacking the excavated soil not more than 50m clear from the edge of the excavation and refilling the trenches after laying pipes 20cm depth including consolidating each layer by ramming, watering etc. complete them and disposing of the surplus soil as directed.

3.00	Man mazdoor	Each	40.50	Rs. 121.50
4.00	Boys	Each	30.50	Rs. 122.00
L.S.	Watering charges	L.S.		Rs. 0.75
		Total		Rs. 244.25
		Add 15% HTA		36.63
		Add 10% C.P.		28.08
				Rs. 308.96/10m

Rs. 308.96/10 m3

2) -do- in hard soil -do-

5.00	Man mazdoor	Each	40.50	Rs. 202.50
4.00	Boys	Each	30.50	Rs. 122.00
L.S.	Watering charges	L.S		0.90
		Total		325.40
		Add 15% HTA		48.81
		Add 10% C.P.		37.42
				Rs. 411.63/10m

Rs. 411.63/10 m3

3) -do- in ordinary rock -do-

18.00	Man mazdoor	Each	40.50	Rs. 729.00
4.00	Boys	Each	30.50	Rs. 122.00

L.S.	Watering charges	L.S	Rs. 3.00
			854.00
		Add 15% HTA	128.10
		Add 10% C.P.	98.21
			1080.31/10m3

Rs. 1080.31/10 m3

4. Excavating in hard rock for trenches by blasting for laying pipes and stacking useful materials for measurements and disposing unserviceable materials with in the initial lead of 50m and lift up to 1.5m and providing protection by earth filling cement bags during blasting to avoid damages to nearby structures (200 nos. of earth filled cement bags for 10 m3 of blasting)

Rate vide item 1004 – Rs. 995.35/10m3	:	99.53
20 nos. of earth filled cement bags for providing protection. (Rate vide sub data 9 given below: 8.65/bag	:	173.00
		272.53
Add 15% HTA		40.89
Add 10% C.P.		31.34
		344.75/ m3

Rs. 3447.50/10m3

Sub data - 9

Excavation in hard rock for trenches by blasting for laying pipes and stacking useful materials.

Materials

5 Kg country blasting poweder @ Rs. 17.70/kg	:	Rs. 88.50
15 country fuse @ Rs. 5.15/m	:	Rs. 77.25

Labour

12.00 Quarryman (for boring holes 45m deep and 19 to 23mm dia) @ R. 50/E	: Rs. 600.00
2.00 Quarryman (for charging holes with powder and tamping & firing) @ R. 50.00/E	: Rs. 100.00
1.20 Hammerman (for breaking big boulders) @ R. 40.50/E	: Rs. 48.60
2.00 Man (for removing blasted rock to a distance of 50m) @ R. 40.50/E	: Rs. 81.00
	: Rs. 995.35/1

Sub data for earth filled cements bags for providing protection during blasting:

a) Earthwork excavation in ordinary soil (vide item 56 of PWD standard data)	
0.90 Man @ R. 40.50/E	: 36.45
2.75 Boys @ R. 30.50/E	: 83.88
	: 120.33
Add 15% MTA = 18.04	: 138.37/10m3
b) 1 No. Cost of empty cement bag @ R. 2.00/E	: 2.00
L.S. Conveyance L.S.	: 0.50
0.025m3 Earth work excavation in ordinary soil (vide sub data at (a) above for filling the earth in cement bag @ R. 138.37/10m3	: 0.35
0.25 Man for filling the earth in earth cement bags and tying @ R. 40.50/E	: 1.01
L.S Cost of coir yarn L.S.	: 0.10
	: 3.96
Add 15% MTA	: 0.59
	: 4.55

Assuming that the earth filled cement bags can be use twice, the rate is 4.55 ÷ 2	: @. 2.27
c) 0.025 Man for conveying the earth filled cement bags near to the well/trench site @ R. 40.50/E.	: 1.01
0.025 Man for lowering earth filled cement bags in well/trench @ R. 40.50/E.	: 1.01
0.025 Boys for assisting @ R. 30.50/Each	: 0.76
	: 2.78
Add 15% HTA	: 0.41
	: 3.19
d) Labour for lifting the earth filled cement bags from the well/trench after blasting and stacking for the next blasting rate same as (c) above	: 3.19
the rate for one earth filled cement bag (b) + (c) + (d) = 2.27+3.19+3.19	
Say R. 8.65/bag	
5) Laying 300mm Cl.B pipe including specials and fittings after conveyance them within initial leads, and carefully lowering into trenches placing in position to lines and levels ready for joining fixing caution boards and re-filling the trenches etc. complete 100m	
26.80 Heavy load mazdoor E 50.00	: 1340.00
1.5 Fitter E 60.00	: 210.00
L.S. Hire for tools L.S.	15.00
L.S. for lighting, watching and providing caution boards L.S.	: 67.50
	: 1632.50
Add 15% HTA	: 244.87
Add 10% CP	: 187.73
	: 2065.10/10

6) Laying 250mm AC pressure pipe Class-15 Kg. after conveying manually within initial lead lowering into trenches placing in position to lines & levels, ready for jointing including, lighting, watching and providing caution boards.

21.50	Heavy load mazdoor	Each 50.00	: Rs. 1075.
2.50	Fitter	Each 60.00	: Rs. 150.
L.S.	Hire charges for tools required	L.S.	: Rs. 9.
L.S.	Lighting, watching and providing caution boards	L.S.	: Rs. 67.
			: Rs. 1301.
	Add 15% HTA		: 195.
	Add 10% C.P.		: 150.
			: Rs. 1646.

Rs. 1646.40/100m

7) -do- -do- 200mm AC Cl.15 -do-

18	Heavy load mazdoor	Each 50.00	: Rs. 900.0
2.50	Fitter	Each 60.00	: Rs. 150.
L.S.	Hire charges for tools required	L.S.	: Rs. 6.
L.S.	Lighting, watching & providing caution boards etc.	L.S.	: Rs. 67.
			: Rs.1123.
	Add 15% HTA		: Rs. 16.
	Add 10% C.P.		: Rs. 1.
			: Rs.14

Rs. 1422.18/100m

8) -do- -do- 200 AC Cl.10 -do-

16.20	Heavy load mazdoor	Each 50.00	: Rs.
2.60	Fitter	Each 60.00	: Rs.

L.S.	Hire charges for tools required	L.S.	: K. 6.75
L.S.	Lighting, watching & providing caution boards	L.S.	: K. 67.50
			: K. 1034.25
	Add 15% HTA		: K. 155.14
	Add 11% C.P.		: K. 118.94
			: K. 1808.33

K. 1308.33/100m

9) -do- -do- 100mm AC C1.10 -do- -do-

10.80	Heavy Load Mazdoor	Each 50.00	: K. 540.00
2.00	Fitter	Each 60.00	: K. 120.00
L.S.	Hire charges for tools	L.S.	: K. 4.50
L.S.	Lighting, watching & providing caution boards	L.S.	: K. 67.50
			: K. 732.00
	Add 15% HTA		: K. 109.80
	Add 11% C.P.		: K. 84.18
			: K. 925.98

K. 925.98/100m

10) -do- -do- 80mm AC C1.20 -do- -do-

7.80	Heavy load mazdoor	Each 50.00	: K. 390.00
1.50	Fitter	Each 60.00	: K. 90.00
L.S.	Hire charges for tools required	L.S.	: K. 3.60
L.S.	For lighting, watching and providing caution boards		: K. 67.50
			: K. 551.10
	Add 15% HTA		: K. 82.67
	Add 11% C.P.		: K. 65.38

11) Jointing 300mm CI pipes already laid to lines and levels in the trenches using hemp and lead including throughly cleaning the ends centering, inserting hemp melting and pouring the lead into the joint etc. as per specification etc. complete.

Materials

7.20 Kg	Lead	Kg	37.50	270.00
0.48 Kg	Hemp	Kg	22.50	10.80
25 Kg	Firewood	T	1200 .00	30.00
Labour				
0.68	Fitter	E	60.00	40.80
0.24	Man mazdoor	E	40.50	9.72
L.S.	Hire for tools		L.S.	1.59
				352.91
	Add 15% HIA			54.43
	Add 10% CP			51.73
				459.07

Rs. 459.07/E

12) Jointing 250mm AC pipes laid to lines and levels in the trenches using C.I. detachable or any available type of joint after cleaning the ends, centering the pipes inserting the joints and tightening including conveying the materials within initial lead and other sundries etc. complete to make a water tight joint capable to with stand the required pressure.

0.10 Fitter	Each	60.00	
0.10 Mason	Each	60.00	
L.S. Sundries	L.S.		
Add 10% C.P.			
Add 15% HIA			

Rs. 16.32/E Joint

13.	-do- -do- 200mm AC -do-			
	0.08 Fitter	Each	60.00	: Rs. 4.80
	0.80 Mason	Each	60.00	: Rs. 4.80
	L.S. Sundries	L.S.		: Rs. 0.90
				: Rs.10.50
	Add 15% HTA			: Rs. 1.57
	Add 10% C.P.			: Rs. 1.20
				: Rs.13.27

Rs. 13.27/Each joint

14.	Joincing 100mm CI 20 -do- -do-			
	0.05 Fitter	E	60.00	: Rs. 3.00
	0.05 Mason	E	60.00	: Rs. 3.00
	L.S. Sundries		L.S.	: Rs. 0.45
				: Rs. 6.45
	Add 15% HTA			: Rs. 0.97
	Add 10% CP			: Rs. 0.74
				: Rs. 8.16

Rs. 8.16/P joint

do -do- 80mm AC Cl 20 -do- -do-

	0.04 Fitter	E	60.00	: Rs. 2.40
	0.04 Mason	E	60.00	: Rs. 2.40
	L.S. Sundries		L.S.	: Rs. 0.45
				: Rs. 5.25
	Add 15% HTA			: Rs. 0.79
	Add 10% CP			: Rs. 0.60
				: Rs. 6.64

Rs. 6.64/E joint

16. Conveying, treading, laying, fitting and jointing 32mm nominal dia GI pipes and specials such as tees, bends, elbows, check nuts etc. with clamps, including cutting etc. complete.

L.S.	White lead, cotton yarn, oil etc.		L.S.	
L.S.	Materials for making good structures interfered with		L.S.	
L.S.	Hire for tools		L.S.	
	Labour			
1.32	Fitter	each 60.00		
1.30	Man mazdoor	Each 40.50		
L.S.	Labour for making good structure		L.S.	
	Add 15% HTA			
	Add 10% C.P.			

Rs. 175.20/10m

17. -do- -do- 40mm GI -do-

L.S.	White lead cotton yarn, oil etc.		L.S.	
L.S.	Materials for making good structures		L.S.	
L.S.	Hire for tools		L.S.	
1.72	Fitter	60.00 Each		
1.6	Man Mazdoor	40.50 Each		
L.S.	Labour for making good structures		L.S.	
	Add 15% HTA			
	Add 10% C.P.			

Rs. 223.33/10m

18. -do- -do- 50mm GI -do-

L.S.	White lead,cotton yarn, Oil etc.		L.S.	: Rs. 5.85
L.S.	Materials for making good structures		L.S.	: Rs. 5.85
L.S.	Hire for tools		L.S.	: Rs. 2.25
2.02	Fitter	60.00	Each	: Rs.127.20
2.00	Man mazdoor	40.50	Each	: Rs. 81.00
L.S.	Labour for making good structure		L.S.	: Rs. 2.25
				: Rs.224.40
	Add 15% HTA			: Rs. 33.66
	Add 10% C.P.			: Rs. 25.80
				: Rs.283.86/10m

Rs. 283.86/10m

19. -do- -do- 65mm -do-

L.S.	White lead,cotton,yarn etc.		L.S.	: Rs. 6.75
L.S.	Materials for making good structures		L.S.	: Rs. 6.75
L.S.	Hire for tools		L.S.	: Rs. 2.25
2.23	Fitter	60.00	Each	: Rs.139.20
2.20	Man mazdoor	40.50	Each	: Rs. 89.10
L.S.	Labour for making good structures		L.S.	: Rs. 2.25
				: Rs.246.30
	Add 15% HTA			: Rs. 36.94
	Add 10% C.P.			: Rs. 28.32
				: Rs.311.56/10m

Rs. 311.56/10m

20. -do- -do- 80mm GI -do- -do-

L.S.	White lead,cotten yarn etc.		L.S.	:	Rs. 5.75
L.S.	Materials for making good the structures		L.S.	:	Rs. 5.75
L.S.	Hire for tools		L.S.	:	Rs. 5.75
3.42	Fitter	Each	60.00	:	Rs.205.20
3.42	Man mazdoor	Each	40.00	:	Rs.136.80
L.S.	Labour for making good the structure		L.S.	:	Rs. 5.00
				:	Rs.368.95
	Add 15% HTA			:	Rs. 55.49
	Add 10% C.P.			:	Rs. 41.55
				:	Rs.466.00

Rs. 466/10m

21. -do- -do- 100mm GI -do-

L.S.	White lead,cotten yarn etc.		L.S.	:	Rs. 11.50
L.S.	Materials for making good structures		L.S.	:	Rs. 11.50
L.S.	Hire for tools		L.S.	:	Rs. 5.00
3.32	Fitter	Each	60.50	:	Rs. 199.20
3.32	Man mazdoor	each	40.50	:	Rs. 133.46
L.S.	Labour for making good structures		L.S.	:	Rs. 5.00
				:	Rs. 367.66
	Add 15% HTA			:	Rs. 55.10
	Add 10% C.P.			:	Rs. 41.48
				:	Rs. 456.24/10m

Rs. 456.24/10m

22	-do- -do- 150mm GI -do-			
	L.S. White lead, cotton yarn etc.	L.S.		: Rs. 17.55
	L.S. Materials for making good structures	L.S.		: Rs. 17.55
	L.S. Hire for tools	L.S.		: Rs. 6.75
	6.38 Fitter	Each	60.00	: Rs. 381.60
	6.00 Man mazdoor	Each	40.50	: Rs. 243.00
	L.S. Labour for making good structures	L.S.		: Rs. 6.75
				: Rs. 673.20
	Add 15% HTA			: Rs. 100.98
	Add 10% C.P.			: Rs. 77.41
				: Rs. 851.59

Rs. 851.59/10m

23. a) Testing the 40mm pipe line with water to the required test pressure.

165 l	Cost of water required for filling in the pipe line including conveyance charges for the water to the site of testing. 1000 l		7.50	: Rs. 1.24
8 nos.	Hire charges for 65mm long 16mm bolts & nuts (1/8th cost)	Kg.	25/8	: Rs. 3.91
0.30	Fitters for fixing dummy plates etc. and connecting the pipe line to pump delivery	Each	60.00	: Rs. 18.00
0.45m2	Hire charges for rubber packing (1/4th of the actual cost)	Kg	22.50/4	: Rs. 2.53
0.30	man for assisting	Each	40.50	: Rs. 12.15
2 men for 3hrs.	Hire charges for hand pumps and men required for pumping water in to the main & filling	Each	40.50	: Rs. 30.37
3 hrs	Hire charges for reciprocating pumps for building up pressure to the required test pressure	Hour	37.50	: Rs.112.50

L.S.	Hire charges for pressure gauge	L.S.		: R. 15.00
				: R.195.70
	Add 15% HTA			: R. 29.35
	Add 10% C.P.			: R. 22.50
				: R.247.55/150.

R. 247.55/150m (Add 3 Nos joints)

b) -do- -do-	50mm 295 l. cost of water	1000 l.	7.50	: R. 2.21
8 Nos.				
(1¼ Kg)	Hire charges of bolt	Kg.	25/8	: R. 3.91
0.30	Fitter	Each	60.00	: R. 18.00
0.058m3	Hire charges for rubber packing	Kg	22.50	: R. 3.26
0.30	man for assisting	Each	40.50	: R. 12.15
2 men for	Hire charges for hand pump	Each	40.50	: R. 30.37
3. hrs.				
3 hrs.	Hire charges for pumpsets	hr.	37.50	: R.112.50
L.S.	Hire charges for pressure guage	L.S.		: R. 15.00
				: R.197.40
	Add 15% HTA			: R. 29.61
	Add 10% C.P.			: R. 22.70
				: R.249.71

R. 249.71/150m (Add cost of 3 Nos. joints)

c) -do-	-do- 65mm -do-			
425 l.	cost of water	1000 l.	7.50	: R. 3.19
8 Nos.				
(1¼ Kg.	Hire charges of 70mm long bolts & nuts	Kg	25/8	: R. 3.60

0.50 Fitter	Each	60.00		: Rs. 30.00
0.50 Man mazdoor	Each	40.50		: Rs. 20.25
0.060m2 Hire charges for rubber packing	Kg.	22.50 / 4		: Rs. 3.83
2 men for Hire charges for hand pumps 4 hrs	Each	40.50		: Rs. 40.50
4 hrs Hire charges for reciprocaring pumpsets	hr.	37.50		: Rs.150.00
L.S. Hire charges for pressure guage	L.S.			: Rs. 15.00
				: Rs.267.46
Add 15% HTA				: Rs. 40.12
Add 10% C.P.				: Rs. 30.75
				: Rs.338.33

Rs. 338.33/150m (Add cost of 3 nos. joint).

01 -do- -do- 80mm -do- -do-				
755 l Cost of water	1000 l	7.50		: Rs. 5.66
8 Nos. Hire charges for 75mm (1½ Kg) 16mm bolt and nuts	Kg	25.00 / 8		: Rs. 4.69
0.05 Fitter	E	60.00		: Rs. 30.00
0.5 man mazdoor	E	40.50		: Rs. 20.25
0.088m2 Hire charges for rubber plasting (1ch cost)	Kg	22.50 / 4		: Rs. 4.50
2 men for Hire charges for hand pump	E	40.50		: Rs. 45.57
4hrs Hire charges for pump set	Kr.	37.50		: Rs.166.75
L.S. Hire charg for pressure guage	L.S.			: Rs. 15.00
				: Rs.294.42
Add 15% HTA				: Rs. 44.16
Add 10% C.P.				: Rs. 33.86
				: Rs.372.44

Rs. 372.44/150m (Add cost of 3 nos. joint)

e) -do- -do- 100mm -do-

1180 l Cost of water	1000 l.	7.50	: Rs. 8.85
16 Nos Hire charges for 75mm 3Kg long 16mm bolts &nuts	Kg	25/8	: Rs. 9.38
0.75 Fitter	Each	60.00	: Rs. 45.00
0.75 Man mazdoor	each	40.50	: Rs. 30.39
0.097m2 Hire charges for rubber packing	22.50/4		: Rs. 5.46
2 men Hire charges for hand for pump	Each	40.50	: Rs. 45.57
4½ hrs.			
4½ hrs. Hire charges for pumpset	Hr.	37.50	: Rs.168.75
L.S. Hire charges for pressure guage.	L.S.		: Rs. 15.00
			: Rs.328.39
Add 15% HTA			: Rs. 49.25
Add 10% C.P.C			: Rs. 37.76

Rs. 415.40/150 m (Add cost of 3 nos. joint)

f) -do- -do- 150mm -do-

2650 l. Cost of water	1000 l.	7.50	: Rs. 19.88
16 nos. Hire charges for 80mm long 20mm bolts and nuts	Kg.	25.00/8	: Rs. 14.64
1.00 Fitter	Each	60.00	: Rs. 60.00
1.00 Man mazdoor	each	40.50	: Rs. 40.50
0.190m2 Hire charges for rubber packing	Kg	22.50/4	: Rs. 9.11
2men Hire charges for for 5½ hrs. hand pump	Hr.	40.50	: Rs. 55.69
5.5 Hr Hire charge for reciprocating pump	hr.	37.50	Rs.206.25
L.S. Hire charges for pressure guage	L.S.		: Rs. 18.00
			:Rs.424.27
Add 15% HTA			: Rs. 63.64
Add 10% C.P.			: Rs. 49.79
			: Rs.536.70

Rs. 536.70/150m (Add cost of 3 nos. joints

g) ea x 5 nos 200mm -do-

1	Cost of water	1000 l.	7.50	: Rs. 35.55
	Hire charges for 90mm dia 20mm bolts & nuts (1/8th cost)	Kg.	25.90 / 8	: Rs. 16.68
	Fitter	Each	60.00	: Rs. 75.00
	Man mazdoor	Each	40.50	: Rs. 50.63
	Hire charges for rubber packing Kg.	22.50 / 4		: Rs. 13.05
	Men for Hire charges for hand pumping	E	40.50	: Rs. 60.75
	Hire charges for pressure guage	L.S.		: Rs. 18.00
	Hire charges for reciprocating	Hr.	37.50	: Rs.225.00
				: Rs.494.86
	Add 15% HTA			: Rs. 74.23
	Add 10% C.P.			: Rs. 56.90
				: Rs.625.99

Rs. 625.99/150m (Add cost of 3 nos: joint)

do-	-do- 250mm -do-			
7.400	l. Cost of water	1000 l.	7.50	: Rs. 55.50
2	nos. Hire charges for 96mm (18kg) long 20mm bolt	Kg	25.90 / 8	: Rs. 25.00
1.60	Fitter	Each	60.00	: Rs. 99.00
1.50	man mazdoor	Each	40.50	: Rs. 60.75
0.312m2	Hire charges for rubber packing (1/8th cost)	Kg	22.50 / 4	: Rs. 17.55
2men for 8hrs	Hire charges for hand pump	Each	40.50	: Rs. 81.00
8hrs.	Hire charges for pumpset	hr.	37.50	: Rs.300.40
L.S.	Hire charges for pressure guage	L.S.	-	: Rs. 21.00

				B/F Rs. 650.80
				: Rs. 650.80
	Add 15% HTA			: Rs. 97.62
	Add 10% C.P.			: Rs. 74.84
				: Rs. 823.26

Rs. 823.26/150m (Add cost of 3 joints)

i) -do- -do 300mm -do- -Ho-

10600 L	Cost of water	1000L	7.50	: Rs. 79.50
24 nos (8Kg)	Hire charge for 96mm 200mm bolt(with cost)	Kg	25.00	: Rs. 25.00
2.00	Fitter	E	60.00	: Rs.120.00
2.00	Man mazdoor	E	40.50	: Rs. 81.00
0.396m2	Hire charge for Rubber with cost	Kg	22.50	: Rs. 22.28
¼ day	Hire charge for again and pump	Hr	75.50	: Rs.300.00
¼ day	Hire charge for pumpset	Hr.	37.50	: Rs.150.00
L.S.	Hire charge for jointing gauge	L.S.		: Rs. 22.50
				: Rs.800.28
	Add 15% HTA			: Rs.120.04
	Add 10% C.P.			: Rs. 92.03
				Rs. 1012.35

Rs. 1012.35/150m (Add cost of 3 joints)

a) Conveyance P.V.C. pipes of dia 32mm lowering into trenches placing in position aligning to lines and levels and jointing with solvent cement and testing to a specified ... including hire charges for all tools, equipments etc. (Data for 30m)

0.50 Man for cleaning and lowering the pipes into trenches and placing in position	Each	40.50	: Rs. 20.25
... for aligning and ... the pipes	Each	60.00	: Rs. 30.00
... for testing the pipe line ... fitting accessories for testing ... the hand pumps, dismantling ... testing	Each	40.50	: Rs. 20.25
... for conveying water and ... for testing	E.	40.50	: Rs. 8.10
... for lighting, watching and providing ... boards etc.	L.S.		: Rs. 18.00
... Hire charges for tools testing, equipments, accessories etc.		L.S.	: Rs. 6.00
			: Rs. 102.60
Add 15% HTA			: Rs. 15.39
... C.P.			: Rs. 11.79
			: Rs. 129.78

Rs. 4.33/m

... PVC pipes of dia. 50mm ... into trenches etc. as ... above item.

0.60 Man for cleaning and lowering the pipes into trenches and placing in position	Each	40.50	: Rs. 24.30
0.50 Fitters for aligning ... jointing the pipes	Each	60.00	: Rs. 30.00

0.50	Man for testing the pipeline including fitting accessories for testing operating hand pump dismantling after testing	Each	40.50	: R. 20.25
0.35	Man for conveying water and assistance for testing	Each	40.50	: R. 14.18
L.S.	For lighting, watering and providing caution boards etc.	L.S.	-	: R. 13.00
L.S.	Hire charges for tools testing equipments etc.	L.S.	-	: R. 8.00
				: R.115.73
	Add.15% HTA			: R. 17.36
	Add 10% C.P.			: R. 12.30
				: R.145.39
			R. 4.80/m	

Conveying PVC pipe of dia 63mm lowering into trenches etc. as per above.

0.60	Man for lowering the pipes into trenches and placing in position	Each	40.50	: R. 24.30
0.60	Fitter for aligning and jointing the pipes	Each	60.00	: R. 36.00
0.60	Man for testing the pipe line including fitting accessories for testing operating hand pumps dismantling after testing etc.	Each	40.50	: R. 24.30
L.S.	For lighting, watering and providing caution Boards	L.S.	12.00	: R. 15.00
0.40	Man for conveying water and assistance for testing	Each	40.50	: R. 16.20

L.S.	Hire charges for tools testing equipments accessories etc.	L.S.	-	: R. 9.00
				: R.127.80
	Add 15% HTA			: R. 19.17
	Add 10% C.P.			: R. 14.69
				: R.161.66

ie R. 5.39/m

d) Conveying PVC pipes of dia 75mm lowering into trenches etc. as per above:

0.75	Man for cleaning, lowering the pipes into trenches and placing in position	Each	40.50	: R. 30.38
0.70	Fitter for aligning and jointing the pipes	Each	60.00	: R. 42.00
0.70	Man for testing the pipe line including fixing accessories for testing operating hand pumps; dismantling after testing etc.	Each	40.50	: R. 28.35
0.45	Man for conveying water and assistance for testing	Each	40.50	: R. 18.23
L.S.	For lighting, watching & providing caution boards etc.	L.S.	-	: R. 18.00
L.S.	Hire charges for tools, testing equipments etc.	L.S.		: R. 12.00
				: R.148.86
	Add 15% HTA			: R. 22.34
	Add 10% C.P.			: R. 17.13
				: R.188.43/m

ie. 6.28/m

e) Conveying PVC pipes of dia 90mm lowering into trenches etc. as per above

1.00	Man for cleaning, lowering the pipe into trenches and placing in position	Each	40.50	: Rs. 40.50
0.75	Fitter for a aligning & joining pipes	Each	60.00	: Rs. 45.00
0.75	Man for testing the pipeline including fitting accessories for testing, operating hand pumps, dismantling after testing etc.	Each	40.50	: Rs. 30.38
0.70	Man for conveying water & assistance for testing	Each	40.50	: Rs. 28.35
L.S.	For lighting, watching & providing caution boards etc.	L.S.		: Rs. 18.00
L.S.	Hire charges for tools, testing equipments etc	L.S.	-	: Rs. 12.00
				Rs.174.23
	Add 15% HTA			Rs. 26.13
	Add 10% C.P.			: Rs. 20.03
				Rs.220.39/m

i.e.Rs. 7.35/m

f) Conveying PVC pipes of dia 110mm lowering into trenches etc. as per above

1.00	Man for cleaning, lowering the pipe into trenches and placing in position	Each	40.50	: Rs. 40.50
0.80	Fitter for aligning and joining the pipes	Each	60.00	: Rs. 48.00
0.80	Man for testing the pipeline including fitting accessories for testing, operating the hand pump, dismantling after testing	Each	40.50	: Rs. 32.40

0.85	Man for conveying water and assistance for testing	Each	40.50		: R. 34.43
L.S.	For lighting, watching and providing caution boards etc.	L.S.	-		: R. 18.00
L.S.	Hire charges for tools testing equipment accessories etc.	L.S.	-		: R. 15.00
					: R.188.33
	Add 15% HTA				: R. 28.24
	Add 10% C.P.				: R. 21.65
					: R.238.22/r

Ie R. 7.94/m

9) Conveying PVC pipes of dia 140mm. lowering into trenches etc. as per above

1.00	Man for cleaning, lowering the pipes into trenches and placing in position	Each	40.50	: R. 40.50
0.90	Fitter for aligning & joining the pipes	Each	60.00	: R. 54.00
0.90	Man for testing the pipe line including fitting accessories for testing, operating hand pump dismantling after testing	Each	40.50	: R. 36.45
0.85	Man for conveying water and assistance for testing	Each	40.50	: R. 34.43
L.S.	For lighting, watching etc.	L.S.	-	: R. 18.00
L.S.	Hire for tools, lighting equipments, accessories etc.	L.S.	-	: R. 15.00
				: R.198.38
	Add 15% HTA			: R. 29.76
	Add 10% C.P.			: R. 22.81
				: R.250.95

Ie R. 6.27/m

h) Conveying PVC pipe of dia 150mm lowering into trenches etc. as per above

1.00	Man for cleaning & lowering the pipes into trenches	Each	40.50	: Rs. 40.50
1.00	Fitter for aligning & jointing the pipes	Each	60.00	: Rs. 60.00
1.00	Man for testing the pipeline	each	40.50	: Rs. 40.50
0.85	Man for conveying the water ant assistance for testing	each	40.50	: Rs. 34.43
L.S.	For lighting, watching etc.	L.S.	-	: Rs. 18.00
L.S.	Hire for tools, testing equipments accessories etc.	L.S.	-	: Rs. 15.00
				: Rs. 208.43
	Add 15% HTA			: Rs. 31.26
	Add 10% C.P.			: Rs. 23.96
				: Rs. 263.65/m

Say Rs. 8.79/m

Chief Engineer
(Deputy Chief Engineer In Charge)

APPENDICES

1.	Proformae	8 Nos. (Details of Existing Water Supply Scheme & proposed Water Supply Scheme)
2.	Health Statistics	
3.	Water Analysis Report	
4.	River discharge data	
5.	Panchayath resolution	
6.	Reference No. of field books	
7.	Name and disignation of Officers involved in preparing project reports.	

P R O F O R M A - I

SUMMARY OF SCHEMES FURNISHED FOR APPROVAL

Sl. No:	Name of District	No. of Schemes/spot sources piped water supply		To benefit		Population			Estimate cost in lakhs	Per capita cost	
			No. of Scheme spot source	Village Nos.	Habitation/ Hamlet Nos.	Total	SC	ST		Present 1991	Design 2018
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Idukki	1	1	Nil	2	30048	3949	333	455	1682	945/-

Ome.29/4

P R O F O R M A - II

ACCELERATED RURAL WATER SUPPLY PROGRAMME

1. Name of Scheme : A.R.W.S.S. to VAIDANNEDU AND ANAKKARA

2. Name of Block/District : Idukki District, Kerala State.

3. No. of Villages proposals to be covered and their population with SC/ST break up.

No. of Villages	No. of habitation hamlet.	Identification status	Population 1991 Census.		
			Total	SC	ST
Two		Problem Village Category I	30048	3949	335

4. Habitation/Hamlet details

(a) Problem Villages identified prior to the commencement of the sixth plan ie. as on 31.3.1980.

(b) Problem villages identified during 1980-85.

Name of Villages/ habitation/hamlet	Reference in the list submitted to G.O.I.	Population 1991 Census			Existing Source of supply.
		Total	SC	ST	
Vaidannedu	7.2.10	8574			Open well and and streams.
Anakkara		21474			

(i) Other villages

(population 1991 census) Total 30048

considered for coverage SC 3949

ST 335

Design population 48,250

..2/-

7.	Per capital rate of water supply proposed.	:	40 lpcd
8.	Source of supply	:	Amayar river
9.	Method of extraction	:	Weir is proposed to be constructed across river and Intake well cum Pump house near to this weir to pump water to the Treatment Plan
10.	Method of extraction	:	Confirms to standard.
11.	Proposed treatment	:	(Water Analysis report appended) Sedimentation, Filteration and Chlorination.
12.	Method of distribution	:	Gravity flow.
13.	No. of cistern/Stand posts proposed	:	193
14.	Estimated cost	:	529 lakhs.
15.	Per capital cost as per design	:	
16.	Time required for completion	:	2 years
17.	System of maintenance	:	Manual
18.	Name of Agency responsible for maintenance.	:	Kerala Water Authority
19.	Annual maintenance cost (Indicate whether funds will be available for maintenance after completion of the scheme)	:	8,41,000/- 1.64/1000 lit/day.
20.	Sketch plan of the scheme showing ex village(s) hamlets	:	Plan attached.
21.	Any other information	:	As the area is totally undulati with hills and valleys and GI pi had to be used to take care of t static head. The population is scattered amongst the cardenom p ation the length of distribution also is very high. Consequent to these factors the capital cost o scheme is slightly on the higher side. This may be admitted as a special case.

ak/7.4

[illegible] WATER SUPPLY SCHEME

[illegible] WATER SUPPLY PROGRAMME

ANNEXURE - I

Sl. No.	Name of village/Name of existing scheme	Ref. No. in the list submitted to Govt. of India	Population as per 1991 census Total	SC	ST	Design population Total	SC	ST	Details of existing scheme: Reference under which the existing scheme was sanctioned (*)	Whether the scheme is functioning	Scheme designed for the period with population Total	SC	ST	Original estimated cost and the expenditure incurred on the scheme and status of the scheme	Balance population (Design) to be provided with water supply (Col.3 - col.8) Total, SC, ST	Remarks: Source, pipe, Reservoir etc.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.	Vandanmedu and Anakkara	7.2.10	30048	3949	333	51604									49256	Proposed to rehabilitated source Amayar. 80 mm GI - 1000 m 20 GI - 18 m street tap - 3 nos.
	a. Vandanmedu W.S.S.								A.S. No. PHK1 1987/70 dt. 31-5-73 of C.E., PHED, Tvm. Rs.1,51,200/-	Yes	2000			Commissioned in the year 1962 & augmented during 1975.		
	b. Puttady W.S.S.									No						Source dry (Open well)
	c. Puliyanmala W.S.S.								A.S. No. M 5968/81 dt. 4-2-82 of S.E., PH Circle, Kochi-16 Rs.1,95,000/-	Yes	3000			Commissioned in the year 1985		Source - Erakkadu river 80 GI-545 m 65 GI-560 m 50 GI-365 m 40 GI-460 m 25 GI-315 m 20 GI-255 m taps - 13 Nos.
	d. Borewell with H.P. - 3 Nos.									No						Dry.

Notes 1. If it is piped water supply all details regarding the source, pipe sizes, Reservoir capacities, Nos. etc. of the scheme may be furnished.

2. If it is hand pump scheme, No. of hand pumps provided.

No.C4-7133/88. Office of the Dist.Medical Officer of Health.Idukki Dated 15.7.88.

From

The Dist.Medical Officer(H), Idukki.

To

The Assistant Executive Engineer, Investigation Planning & Design Sub Division, Kerala Water Authority, Kulamavu, IDUKKI.

Sub:-Health statistics-request-forwarding- reg.

Ref:-No.IPD 23/81 dt.7.7.88 from Asst.Exe.Engineer-Kulamavu.

.....

Sir,

Referring to the above I wish to inform you that the following water borne and other communicable diseases are not in the villages of Idukki District.

Water Borne diseases:

1. Gastro Entrities.
2. Chlora.
3. Other diarrhoeal diseases.
4. Polio mylities.
5. Viral Hepatitis.
6. Entric fever.

Communicable diseases:

1. Acute Diarrhoeal diseases(other than Cholera).
2. Dophtheria.
3. Poliomilitis.
4. Tetanus(no cretal, other)
5. Whooping cough.
6. Measles.
7. Acute Respiratory infection, Pneumonia.
8. Entric fever.
9. Viral Hepatitis.
10. Japanese encephalitis.
11. Meningo local infection.
12. Rabies.
13. Syphilis
14. Gono coccal infection.
15. T.B.

Yours faithfully,
Sd/- Dist.Medical Officer(

Sd/-
EXECUTIVE ENGINEER

// True Copy//

No.Stat.1-7135/88. Office of the Dist.Medical Officer of Health, Idukki. Dt.26.9.89.

From

The District Medical Officer(Health)
Idukki.

To

The Assistant Executive Engineer,
Kerala Water Authority,
IPD Sub Division, Kulamavu,
Idukki.

Sub:-Health statistics-regarding.
Ref:-1. Your letter No.IPD-23/88 dt.7.7.88 and 23.6.89.
2. This office letter No.C4-7135/88 dt. 15.7.88.

.....

Sir,

Please refer to the above letter, in continuation of the letter 2nd cited, I am to report that cases of water borne diseases have been reported from all the prilimary Health Centres in the District during the last five years. Out of the six water borne diseased mentioned in the above letter, the most of the cases reported are under the ifcse other Diarrhoeal diseases". Recent reports shows that there were cases of gastroenteritics in Primary Health Centre, Chithirapuram and T.H.Q.Thodupuzha, cases of viral Hepatitis in T.H.Q Hospital Poomudu Thodupuzha, Karimannoor, Adimali, Kottappuram and P.H.Centre Upputhara and Enteric fever in T.H.Q Hospital poomudu and Nedumkandam.

It may please be noted that all the intiated areas in the District have sanitary problems especially Vattavada and Marayoor in Chithirapuram P.H.C, Vandiperiyar and Thodupuzha Municipality. Please check the present hygenic condition of the water source in your ochers in Thodupuzha Municipality.

Yours faithfully,
Sd/-
Dist. Medical Officer(Health)
IDUKKI.

Sd/-

EXECUTIVE ENGINEER.

GOVERNMENT ANALYSIS LABORATORY

WATER AND GASES SECTION

The Assistant Engine
Kerala Water Authori
I.P.D. Section, Kula

Report on Analysis of Water

(Bacteriological)

No.WA (P)69/90-91.

Source of sample	P.W.S.S to Vandanmedu
Date of receipt	16--5--1990
No.of colonies on agarin 24 hours (per C.C)	65
No. of colonies on agar in 48 hours (per c.c)	Overgrown
Presence of lactose-fermenting organisms in 24 hours	+ 0.01
Presence of lactose-fermenting organisms in 48 hours	+ 0.01
M.P.N	18000 +

Remarks: Not satisfactory.
Effective chlorination may be done

Place : Cochin - 30

Date : 30-5-1990

(true copy)

WATER ANALYSIS SECTION

REPORT ON ANALYSIS OF WATER

The Assistant Engineer,
Kerala Water Authority, IPD
Section, Kulamavu
20/294/87- 250x100 G.P.S

REPORT ON ANALYSIS OF WATER
(Chemical)

No. WA(P)69/90

Source of sample	A.W.S. to Vandanmedu
Date of collection	
Date of receipt	16--5--1990
PHYSICAL APPEARANCE	Clear brown sediments present
Colour, Taste, Odour	
P.H	7.0
Electrical conductivity	
CHEMICAL	
Alkalinity (Parts per Million)	28.0
Chlorides "	8.0
Nitrates "	Nil
Nitrites "	Nil
Sulphates "	Nil
Oxygen dissolved "	
Oxygen absorbed "	1.8
Ammonia free & saline "	Trace
Ammonia alb minoid "	Nil
Total solids "	116.0
Loss on ignition "	
Hardness - Total "	26.0
" Temporary "	
" Permanent "	
Iron "	0.2
Other Metals if any "	
Remarks: Satisfactory	Date: 30--5--1990

485/2025.

Copy of the Resolution No XVIII passed at the meeting held on 2-6-195[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

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[illegible]

[illegible]

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True Copy

Executive Engg.

Minutes of the Discussion With the Panchayath President Vandanmedu on 7—3—'90.

1. Discussion of Plan.

Panchayath agree, except for an additional line from Pulmedu to Inchipadappu.

2. Pulmedu to Colony 500 m additional lines.

3. Agree for free surrender of land.

1. A. Varkey Sd/-
2. Dr.V.Dharmarajan. Sd/-
3. Mathew Joseph. Sd/-
4. K.M.Chinnadurai. Sd/-
5. P.Jayaraman. Sd/-
6. Mary Joseph. Sd/-

R.W.S.S. TO VANDANMEDU

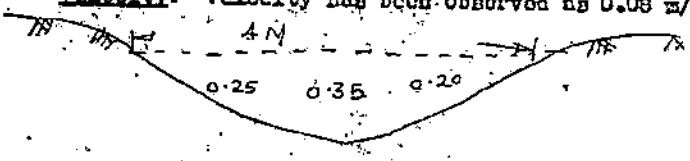
Source - Amyar

Location - Near existing well cum pump house for R.W.S.S to Vandanmedu.

Soundings has been taken at three places and discharges observed as follows:

(a) C/S.Infront of pump house:

Velocity: Velocity has been observed as 0.08 m/Sec.



Area = $\frac{(0.25 + 0.35 + 0.20)}{5} \times 4 = 0.64\ m^2$

Hence Discharge = 0.64×0.08

= $0.051\ m^3/Sec.$

Say : 4.40 mld.

REFERENCE NO. OF FIELD BOOKS.

1) 143/83-84

2) 148/83-84

3) 149/83-84

4) 150/83-84

5) 151/83-84

6) 153/83-84

7) 155/83-84.

NAME AND DESIGNATION OF OFFICERS INVOLVED IN PREPARING PROJECT REPORT.

1.	Sri.V.K.Mohan	–	Asst.Executive Engineer.
2.	Sri.Abdul Nazar Panoly	–	Assistant Engineer.
3.	Sri.Sivankutty, K.P.	–	Surveyor.
4.	Sri.Santhosh. T.D.	–	–do–
5.	Smt. O.S.Devaki	–	–do–
6.	Smt. Sherly John	–	–do–

LIST OF DRAWINGS

Plate No.1 Location Map

" 2 Project Map

" 3 Schematic Diagram

" 4 a) Contour Map - Sheet No.1

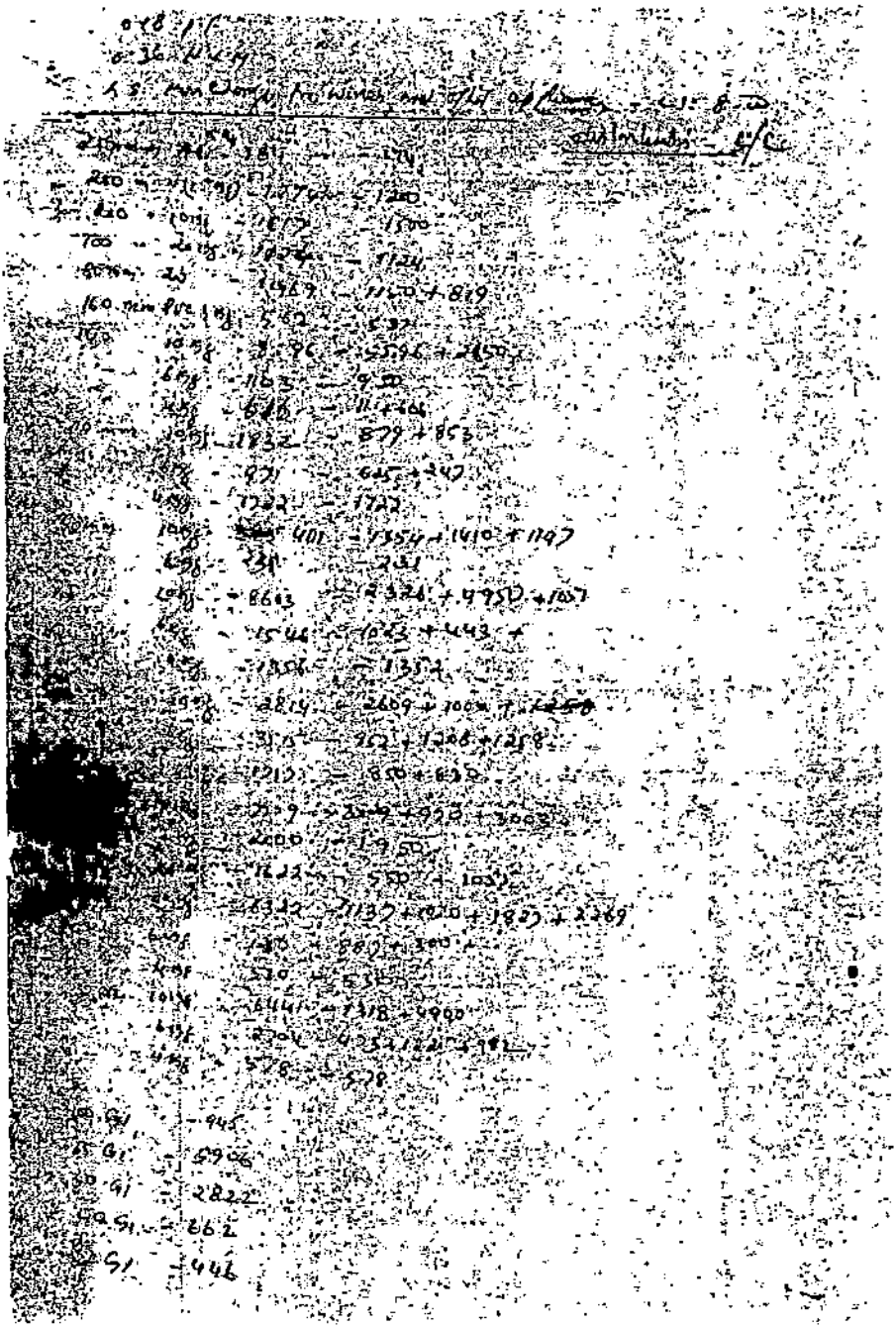
" b) Contour Map - Sheet No.2

" 5 a) Site Plan of G.L.Tank at Vazhavedu

" b) Site Plan of G.L.Tank at Shanghuruncan

" 6 Site Plan of Treatment Plant

" 7 Site Plan (Distribution System)



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