

PROCEEDINGS OF THE CHIEF EXECUTIVE OFFICER
KERALA INFRASTRUCTURE INVESTMENT FUND BOARD,
THIRUVANANTHAPURAM

Present : Dr. K. M. Abraham CFA

ORDER NO : WRD005-128-PA-01 Dated 23.03.2019

Sub:-KIIFB Project – (TRAN2-WRD005-128): Replacement of Transmission Mains in Palakkad Circle -Conditionally approved in 2nd Tranche - Final approval and sanction of funding- Orders issued.

Read:-1. G.O (Rt.) No.1/2018/WRD dated 01.01.2018

2. Minutes of the 28th Board Meeting of KIIFB held on 21.03.2017

ORDER

A major project namely; “*Replacing Transmission mains in 174 schemes 4888 Km Promo Transmission mains*”, which envisages the replacement of old and out dated transmission mains for water supply schemes in Kerala.; was conditionally approved in the 28th Meeting of the KIIF Board held on 21-03-2017 on condition that the conditions set by KIIFB for project-financing would be met and that the status would be reported to the Board. The Board had also authorised the Chief Executive Officer, KIIFB to approve the projects not exceeding value of Rs.400 crore each, subject to compliance of the conditions set by KIIF for project financing and subsequent ratification of the Board.

In consonance with the Board’s decisions, the Main Project “Replacing Transmission mains in 174 schemes 4888 Km Promo Transmission mains” which was further sub divided into eleven sub projects in various Circles- viz Thiruvananthapuram, Kollam, Pathanamthitta, Kottayam, Kochi, Muvattupuzha, Thrissur, Palakkad, Malappuram, Kozhikode and Kannur, for the purpose of functional clarity, were scrutinised. On scrutiny of the compliance report submitted by KWA (SPV), *Replacement of Transmission Mains in Palakkad Circle*, forming an integral part of the main project and designed to avoid the interrupted water supply by reducing the leakages and bursting in the pumping main has been found compliant with KIIFB stipulations, with the following observations:

1. The DPRs contain necessary details including item wise details, water supply scheme, detailed estimate etc.
2. The parameters studied regarding the demand are in favour of the proposed projects.
3. The functional design & engineering design have been attempted.
4. The O& M strategy proposed is satisfactory.
5. The estimate is prepared based on KWA SoR, DSR 14 and market rates. The applicability and correctness of section 6 of DAR shall be responsibility of the TS authority or KWA.
6. Potential revenue streams have been identified as savings in maintenance cost and an

additional sale of water which is expected to be saved due to replacement.

7. The investment criteria (CBR) have been documented.
8. The WBS is based on the rational sequencing of activities, but details of cash flow not seen attached in the WBS.
9. The project management organization plans seem satisfactory.
10. The contract management plans are acceptable provided the documents and procedures are not in conflict with any of the rules and regulations regarding public works execution prevailing in Govt of Kerala.
11. Explanations regarding the statutory clearances are acceptable.
12. No major environmental aspects are noted. The projects are beneficial to the people who are dependent on pipelines for drinking water.
13. The quality management plans are acceptable.
14. The risk management plan shall be one which eliminates and mitigates all time and cost overrun risk elements.

Considering the above, final approval and sanction is accorded for funding the Project: **TRAN2-WRD005-128: Replacement of Transmission Mains in Palakkad Circle** which comes under the main project "Replacing Transmission mains in 174 schemes 4888 Km Promo Transmission mains", approved vide Government Order read above, to be implemented by the Kerala Water Authority (Special Purpose Vehicle), limiting the total outlay to **Rs.34.07 Crore (Rupees Thirty-Four Crore and Seven Lakh only)**, against the revised proposed cost of Rs.34.97 crore, as noted below and also with the stipulations thereunder.

Project 1 - Comprehensive and RWSS to Kollengode and adjoining Panchayats- Replacement of 300mm AC clear water Gravity main from Meenkara Kalikkavu OSHR to Kollengode OHSR with 300 mm D1 K9 pipe - **Rs. 709.40 lakh.**

Project 2 - CARWSS to Kozhinjanpara and adjoining Villages- Replacement of 200 mm AC clear water gravity main from Master OHSR at Moonkilmada to Sathram sump with 200mm D1 K9 pipe for 16000m – **Rs. 587.29 lakh.**

Project 3 - UWSS to Ottapalam Municipality- Replacement of 200, 150, 100 and 80 mm AC distribution lines at Ottapalam town and East Ottapalam area - **Rs. 35.68 lakh.**

Project 4 - UWSS to Ottapalam - Replacement of 100mm and 80mm AC distribution lines at Kaniyapuram, Varode and Thottakkara areas - **Rs. 34.40 lakh.**

Project 5 - UWSS to Ottapalam Municipality- Replacement of 300mm AC distribution line along Veettampara Varode area - **Rs. 36.34 lakh.**

Project 6 - UWSS to Shornur Municipality - Replacement of 300 to 80mm AC distribution lines for zone 1 OHSR area - **Rs. 688.01 lakh.**

Project 7 - UWSS to Shornur Municipality- Replacement of 300 to 80mm AC distribution lines for zone II GLSR area – **Rs. 576.46 lakh.**

Project 8 - UWSS to Shornur Municipality - Replacement of 300 to 80mm AC distribution lines AC Distribution Lines for Zone -III – Kulapully Area - **Rs. 702.86 lakh.**

Project 12 - UWSS to Ottapalam Municipality – Replacement of 300mm AC Distribution lines along Veettampara Panamanna road. - **Rs. 38.14 lakh.**

(The projects No.9, 10 & 11 proposed, are not considered under KIIFB funding, since the same are taken up for funding under AMRUT Scheme)

1. The Tripartite agreement as per KIIFB stipulations shall be executed. The Technical sanction is mandatory before schedules are added to the tripartite agreement and also before initiating tendering process.
2. The Technical Sanction shall be issued by the competent authority by ensuring the

- reasonableness of the rates adopted in the estimate by comparing with the rates of equivalent items in PRICE. The detailed estimate shall also be checked against the designs, drawings and network diagrams developed for each project. Documentary evidence of these actions shall be communicated to KIIFB prior to acceptance of tenders.
3. The payment for the road restoration shall be based on actuals and the applicability of taxes, excise duties etc. shall be as per the prevailing rules/policies applicable to GoK/KWA/KIIFB. The guidelines issued vide G.O (Rt) No.444/2018/Fin Dated 26.11.2018 shall be followed with respect to utility shifting/ road restoration.
 4. The cost provisions for work alone shall be utilized for execution of work. The savings or anticipated savings shall not be re-appropriated for meeting expenditure of work proper.
 5. While entrusting the maintenance activities to the contractor, it shall be ensured that the obligation under defect liability shall be performed without any additional cost. Hence no maintenance expenditure is considered under the original work.
 6. The cost benefit analysis should be reworked considering the surplus revenue generating scenario and intimated to KIIFB before start of work.
 7. The Detailed Appraisal Report of KIIFB is appended for reference, which shall be taken in to consideration by the TS Committee while according Technical Sanction to the project.

Dr. K. M. Abraham CFA
Chief Executive Officer

To

The Principal Secretary to Government, Water Resource Department
The Managing Director, Kerala Water Authority, Thiruvananthapuram.
The Principal Secretary (Finance)
F&A Division (KIIFB)
Inspection Authority (KIIFB)
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ASST. PROJECT MANAGER





Defining the Future

DETAILED APPRAISAL REPORT

DETAILED PROJECT REPORT FOR REPLACEMENT OF TRANSMISSION MAINS IN PALAKKAD CIRCLE

Rep No. AR-2016-TRAN2-WRD-005-128



Detailed Appraisal Report –
REPLACEMENT OF TRANSMISSION MAINS IN PALAKKAD CIRCLE



1. SALIENT FEATURES AND EXECUTIVE SUMMARY

1.1 Project details in brief:

Name of Project	:	KWA- Replacement of Transmission Mains in Palakkad
District	:	Palakkad
Project outlay	:	Rs.34.97 Crore (Revised Cost from 39.28 Crore)
Implementing Agency/SPV	:	Kerala Water Authority (KWA)
Report Prepared by	:	Kerala Water Authority (KWA)
Data reviewed	:	Detailed Project Report for Replacement of Transmission Mains in Palakkad Circle and the revised DPR's & replies submitted based on the Technical Appraisal Report and compliance notes

- 1.2 The DPR deals with the replacement of transmission mains for water supply scheme in Palakkad circle. The DPR proposes replacement schemes for a total of 12 projects for a total cost of Rs. 34.97 Crore.
- 1.3 The age of existing pipes in most of the regions is more than design life. Leakages and bursting are common, and this should be urgently replaced.
- 1.4 The replacement of the damaged pipes reduces the wastage of water, maintenance cost incurred for repairs.
- 1.5 The following are the proposed projects.
- **Project 1**-Comprehensive and RWSS to Kollengode and adjoining Panchayats-Replacement of 300mm AC clear water Gravity main from Meenkara Kalikkavu OSHR to Kollengode OHSR with 300 mm D1 K9 pipe. - Project cost – Rs. 710.00 Lakhs. (Initial cost Rs. 600.00 Lakhs)
 - **Project 2**- CARWSS to Kozhinjanpara and adjoining Villages-Replacement of 200 mm AC clear water gravity main from Master OHSR at Moonkilmada to Sathram sump with 200mm D1 K9 pipe for 16000m. - Project cost – Rs. 600.00 Lakhs. (Initial cost Rs. 543.00 Lakhs)
 - **Project 3**-UWSS to Ottapalam Municipality-Replacement of 200,150,100 and 80 mm AC distribution line at Ottapalam town and East Ottapalam area. - Project cost – Rs. 36.00 Lakhs. (Initial cost Rs. 34.00 Lakhs)
 - **Project 4**-UWSS to Ottapalam -Replacement of 100mm and 80mm AC distribution line at Kaniyapuram, Varode and Thottakkara areas. - Project cost – Rs. 38 Lakhs. (Initial cost Rs. 33.00 Lakhs)
 - **Project 5**-UWSS to Ottapalam Municipality-Replacement of 300mm AC distribution line along Veettampara Varode area. - Project cost – Rs. 37 Lakhs. (Initial cost Rs. 34.00 Lakhs)



- **Project 6**-UWSS to Shornur Municipality -Replacement of 300 to 80mm AC distribution lines for zone 1 OHSR area. - Project cost – Rs. 725 Lakhs. (Initial cost Rs. 650.00 Lakhs)
- **Project 7**-UWSS to Shornur Municipality-Replacement of 300 to 80mm AC distribution lines for zone II GLSR area. - Project cost – Rs. 585 Lakhs. (Initial cost Rs. 535.00 Lakhs)
- **Project 8**-UWSS to Shornur Municipality -Replacement of 300 to 80mm AC distribution lines AC Distribution Lines for Zone -III – Kulapully Area. - Project cost – Rs. 727 Lakhs. (Initial cost Rs. 590.00 Lakhs)
- **Project 9**-PWSS – Palakkad Municipality Replacement of Old 150mm AC and 125mm AC distribution lines with 160mm PVC (6Kg/cm²) pipe in Thirunellai area. (Initial cost Rs. 200.00Lakhs)
- **Project 10**-Replacing old damaged 150mm AC Distribution Main by laying 250mm DI K9 pipe- Shekariapuram near petrol pump to Fort Maiden near IMA Hall – 3600m. (Initial cost Rs. 250.88Lakhs)
- **Project 11**-Palakkad laying 250mm DI K9 distribution main Kunnumpuram, Pechiamman nagar, Poochira up to SAI hospital at Olavakkode- 5600m. (Initial cost Rs. 340.00 Lakhs)
- **Project 12**-UWSS to Ottapalam Municipality – Replacement of 300mm AC Distribution lines along Veettampara Panamanna road. - Project cost – Rs. 39 Lakhs. (Initial cost Rs. 33.00 Lakhs)

The project 9, project 10, project 11 are not considered under KIIFB funding. The projects have been taken up for funding under AMRUT scheme.

2. REQUIREMENT/DEMAND ANALYSIS

PROJECT 1

- 2.1 The proposal is for replacing 300mm AC pipe with 300mm DI K9 pipes for a length of 12500m.
- 2.2 The age of the existing 300mm AC pipes is 20years and the scheme was commissioned 12 years ago. The pipe line was procured in early 1996 and laying was completed in 2002.
- 2.3 The class of the pipe is class-10.
- 2.4 The inconsistency in the class of the pipe line, undulated terrain, increased traffic flow and reduced earth cover has caused the bursting and leakage of pipes.

PROJECT 2

- 2.5 The project proposes to replace the 200mm AC pipe lines laid in the scheme area with 250mm diameter ductile iron pipes for a 16-km stretch.
- 2.6 The existing AC pipes are in dilapidated condition being very old and are not in serviceable condition.
- 2.7 Leakages and bursting in the existing pipe causing high maintenance cost



- 2.8 The frequent breakages on the existing pipe line is almost more than 100 numbers per annum and the rectification expense costs around 6 lakhs
- 2.9 The design period of the existing scheme is over. The existing AC pipes in the area are class-10 and class-15
- 2.10 By replacing this pipe, 100% of maintenance cost can be saved for at least 10 years and 80% of NRW can be saved in future.

PROJECT 3

- 2.11 The proposal is for replacing old and outdated 200mm, 150mm, 100mm and 80mm AC distribution lines with 160mm PVC C13/150mm GI pipes for a total length of 1470m.
- 2.12 The age of the existing AC pipes is more than 15 years.
- 2.13 Wear and tear of the existing pipe line reduced the withstanding capacity, which in turn resulted in the frequent breakages of the pipe line.
- 2.14 The frequent breakages on the existing pipe line is almost more than 18 numbers per annum.
- 2.15 By replacing this pipe, water supply will improve considerably, resulting in a better revenue for KWA. Maintenance cost and NRW shall be reduced to minimum.

PROJECT 4

- 2.16 The project proposes to replace the 100mm and 80mm AC distribution lines with 160mm PVC (6Kg)/GI(M) pipes for a total length of 2850m.
- 2.17 The age of the existing pipe lines is more than 15 years. Frequent busting of the existing pipes creates interrupted water supply.
- 2.18 By replacing the existing 100mm and 80mm AC distribution lines with 160mm PVC (6Kg)/GI(M) pipes, brings out a superior revenue for KWA.

PROJECT 5

- 2.19 The proposal is for replacing old and outdated 300mm AC distribution lines with 300mm DI K9 pipes for a total length of 520m.
- 2.20 The class of the pipe is class-10.
- 2.21 The existing pipe were laid during 1998. The constant busting of the existing pipes causing high maintenance cost.
- 2.22 By replacing the existing 300mm AC distribution lines with DI K9 pipes, maintenance cost can be highly reduced.

PROJECT 6

- 2.23 The project proposes to replace the existing 300mm to 80mm AC distribution lines with 300mm DI-K9 pipes to 200mm DI-K9 pipes and 160mm PVC pipes for a total length of 28200m.



- 2.24 The existing pipe were laid during 1994 to 1998
- 2.25 The end of the useful life period results in the busting of pipes, thereby interrupting water supply.
- 2.26 The image of KWA can be improved by replacing the old AC pipes by DI/PVC pipes.
- 2.27 With the improved service connections after the replacement, maintenance cost and non-revenue water shall reduce to minimum.

PROJECT 7

- 2.28 The proposal is for replacing the 300mm to 80mm AC distribution lines with 300mm DI-K9 pipes to 200mm DI K9 pipes and 160mm to 90mm PVC pipes for a total length of 21800m.
- 2.29 The existing pipe were laid during 1994 to 1998. The continuous busting of the existing pipes disturbs the water supply.
- 2.30 The implementation of the proposal results in the better revenue for KWA. Replacement of AC pipes are sufficient to meet the future demand.

PROJECT 8

- 2.31 The project proposes to replace the old 300mm to 80mm Ac distribution lines with 400mm DI-K9 pipes to 200mm DI K9 pipes and 160mm to 90mm PVC pipes for a total length of 27600 m
- 2.32 The age of the existing pipe is more than 15 years.
- 2.33 The vulnerability of the existing pipe line has affected the withstanding capacity, which in turn results in the constant breakages on the same
- 2.34 By replacing this pipe, maintenance charge can be saved for at least 10 years.

PROJECT 12

- 2.35 The report proposes to replace the old 300mm AC Distribution mains with 300mm DI K9 pipes for a total length of 675m.
- 2.36 The existing pipe were laid during 1998 and are frequently bursting now a day causing water supply interruption as well as damages of BM & BC roads causing huge loss by the way of maintenance cost and unaccounted water.

3. FUNCTIONAL DESIGN

PROJECT 1

- 3.1 The project is for replacement of existing pipes, the functional design is not done.

PROJECT 2

- 3.2 The proposal is an existing scheme with the source at Kunnamkattupathy in the bank of Chitturpuzha and a 4.5 MLD WTP at Moongilmada.



- 3.3 The treated water is supplied in the areas in Kozhinjampara, Eruthempathy, Vadakarapathy & surrounding area through OHSRs at various places.

PROJECT 3

- 3.4 The existing source of UWSS Ottapalam is at Koottilmukku in the bank of Bharathapuzha and 13 MLD WTP is at Kayarampara.
- 3.5 The treated water is supplied in the area in Ottapalam Municipality through Overhead/Ground level tanks at various places.
- 3.6 The per capita demand is designed for continues supply of 150 lpcd.

PROJECT 4

- 3.7 The proposal UWSS Ottapalam is an existing scheme with an ultimate capacity of 13 MLD where the existing source is at Koottilmukku in the bank of Bharathapuzha and WTP at Kayarampara.
- 3.8 The treated water is supplied in the area in Ottapalam Municipality through overhead /ground level tanks at various places.
- 3.9 The scheme is designed for a supply of 150 lpcd.

PROJECT 5

- 3.10 The proposal UWSS Ottapalam is an existing scheme with an ultimate capacity of 13 MLD where the existing source is at Koottilmukku in the bank of Bharathapuzha and WTP at Kayarampara.
- 3.11 The treated water is supplied in the area in Ottapalam Municipality through overhead /ground level tanks at various places.
- 3.12 The scheme is designed for a supply of 150 lpcd.

PROJECT 6

- 3.13 The proposal UWSS to Shornur Municipality is an existing scheme with capacity of 9.18 MLD where the source is at Bharathapuzha river and new treatment plant of 20 MLD capacity is proposed at Shornur office compound.
- 3.14 The treated water is supplied through the existing OHSR and GLSR at Shornur to various zones of Shornur Municipality with a supply of 150 lpcd.

PROJECT 7

- 3.15 The proposal UWSS to Shornur Municipality is an existing scheme with capacity of 9.18 MLD where the source is at Bharathapuzha river and new treatment plant of 20 MLD capacity is proposed at Shornur office compound.
- 3.16 The treated water is supplied through the existing OHSR and GLSR at Shornur to various zones of Shornur Municipality with a supply of 150 lpcd.

PROJECT 8



- 3.17 The proposal UWSS to Shornur Municipality is an existing scheme with capacity of 9.18 MLD where the source is at Bharathapuzha river and new treatment plant of 20 MLD capacity is proposed at Shornur office compound.
- 3.18 The treated water is supplied through the existing OHSR and GLSR at Shornur to various zones of Shornur Municipality with a supply of 150 lpcd.

PROJECT 12

- 3.19 The proposal UWSS Ottapalam is an existing scheme with an ultimate capacity of 13 MLD where the existing source is at Koottilmukku in the bank of Bharathapuzha and WTP at Kayarampara.
- 3.20 The treated water is supplied in the area in Ottapalam Municipality through overhead /ground level tanks at various places.
- 3.21 The scheme is designed for a supply of 150 lpcd.

4. ENGINEERING DESIGN

PROJECT 1

- 4.1 The scheme is designed based on CPHEEO standards
- 4.2 The schematic diagram and layout of the project is provided in the report.
- 4.3 Valves and chambers are decided based on CPHEEO manual specification. Size of valve depends on the volumetric flow rate through the valve and the differential pressure across the valve. Size of chamber depends on the type of road.
- 4.4 Trench dimensions are estimated as per KWA Standards. Depth of trench is calculated in such a manner to get a minimum coverage of 90 cm above the pipe line.

PROJECT 2

- 4.5 The scheme is designed based on CPHEEO standards
- 4.6 The schematic diagram and layout of the project is provided in the report.
- 4.7 Design of thrust/Anchor block/Valve chamber is as per KWA standards
- 4.8 Depth of trench is calculated in such a manner to get a minimum coverage of 90cm above the pipe line.
- 4.9 C value of lined DI pipes and AC pipes are same for design purpose
- 4.10 For controlling of water distribution, sluice valve, gate valves Duo jet air valves for venting are designed as per IS standards.
- 4.11 Valves and chambers are decided based on CPHEEO manual specification. Size of valve depends on the volumetric flow rate through the valve and the differential pressure across the valve. Size of chamber depends on the type of road.



- 4.12 Trench dimensions are estimated as per KWA Standards. Depth of trench is calculated in such a manner to get a minimum coverage of 90 cm above the pipe line.

PROJECT 3

- 4.13 The scheme is designed based on CPHEEO standards
- 4.14 The node diagram/node details, layout of the project and schematic diagrams are provided in the report.
- 4.15 For design purpose, C value of lined DI pipes and AC pipes are same
- 4.16 Valves and chambers are decided based on CPHEEO manual specification. Size of valve depends on the volumetric flow rate through the valve and the differential pressure across the valve. Size of chamber depends on the type of road.
- 4.17 Trench dimensions are estimated as per KWA Standards. Depth of trench is calculated in such a manner to get a minimum coverage of 90 cm above the pipe line.

PROJECT 4

- 4.18 The scheme is designed based on CPHEEO standards
- 4.19 The node diagram/node details, layout of the project and schematic diagrams are provided in the report.
- 4.20 For design purpose, C value of lined DI pipes and AC pipes are same
- 4.21 Valves and chambers are decided based on CPHEEO manual specification. Size of valve depends on the volumetric flow rate through the valve and the differential pressure across the valve. Size of chamber depends on the type of road.
- 4.22 Trench dimensions are estimated as per KWA Standards. Depth of trench is calculated in such a manner to get a minimum coverage of 90 cm above the pipe line.

PROJECT 5

- 4.23 The scheme is designed based on CPHEEO standards
- 4.24 The node diagram/node details, layout of the project and schematic diagrams are provided in the report.
- 4.25 For design purpose, C value of lined DI pipes and AC pipes are same
- 4.26 Valves and chambers are decided based on CPHEEO manual specification. Size of valve depends on the volumetric flow rate through the valve and the differential pressure across the valve. Size of chamber depends on the type of road.
- 4.27 Trench dimensions are estimated as per KWA Standards. Depth of trench is calculated in such a manner to get a minimum coverage of 90 cm above the pipe line.



PROJECT 6

- 4.28 The nodal diagram and layout plan are provided in the report.
- 4.29 The scheme is designed based on CPHEEO standards.
- 4.30 The proposal is providing Ductile Iron pipes with latest technology adopted is based on the KWA pipe policy.
- 4.31 Trench dimensions are estimated as per KWA Standards. Depth of trench is calculated in such a manner to get a minimum coverage of 90 cm above the pipe line.
- 4.32 Valves and chambers are decided based on CPHEEO manual specification. Size of valve depends on the volumetric flow rate through the valve and the differential pressure across the valve. Size of chamber depends on the type of road.

PROJECT 7

- 4.33 The scheme is designed based on CPHEEO standards.
- 4.34 The nodal diagram, schematic diagram and layout plan are provided in the report.
- 4.35 For controlling of water distribution, sluice valve, gate valves Duo jet air valves for venting are designed as per IS standards.
- 4.36 The proposal is providing pipes with latest technology adopted in KWA pipe policy.
- 4.37 Valves and chambers are decided based on CPHEEO manual specification. Size of valve depends on the volumetric flow rate through the valve and the differential pressure across the valve. Size of chamber depends on the type of road.
- 4.38 Trench dimensions are estimated as per KWA Standards. Depth of trench is calculated in such a manner to get a minimum coverage of 90 cm above the pipe line.

PROJECT 8

- 4.39 The nodal diagram, schematic diagram and layout plan are provided in the report.
- 4.40 The scheme is designed based on CPHEEO standards.
- 4.41 For controlling of water distribution, sluice valve, gate valves Duo jet air valves for venting are designed as per IS standards.
- 4.42 The DI K9 pipes adopted for the replacement is based on the prevailing KWA policies.
- 4.43 Valves and chambers are decided based on CPHEEO manual specification. Size of valve depends on the volumetric flow rate through the valve and the differential pressure across the valve. Size of chamber depends on the type of road.
- 4.44 Trench dimensions are estimated as per KWA Standards. Depth of trench is calculated in such a manner to get a minimum coverage of 90 cm above the pipe line.



PROJECT 12

- 4.45 The scheme is designed based on CPHEEO standards.
- 4.46 The nodal diagram, schematic diagram and layout plan are provided in the report.
- 4.47 For controlling of water distribution, sluice valve, gate valves Duo jet air valves for venting are designed as per IS standards.
- 4.48 The proposal is providing pipes with latest technology adopted in KWA pipe policy.
- 4.49 Valves and chambers are decided based on CPHEEO manual specification. Size of valve depends on the volumetric flow rate through the valve and the differential pressure across the valve. Size of chamber depends on the type of road.
- 4.50 Trench dimensions are estimated as per KWA Standards. Depth of trench is calculated in such a manner to get a minimum coverage of 90 cm above the pipe line.

5. O&M STRATEGY

- 5.1 At present the general engineering staff of the KWA takes care of the water supply system management.
- 5.2 Operation and maintenance is proposed to be done based on annual maintenance contract.

6. FINANCIAL ESTIMATES & COST PROJECTIONS

PROJECT 1

- 6.1 The estimation of the various components is based on DSR and KWA SoR. For items, not available in SoR, recently approved rates by local competent authorities of KWA have been adopted. The road restoration charges by PWD is provided for reference but the same issued for BMBC restoration is not provided (Issued by Chief engineer-NH).
- 6.2 The abstract/bill of quantities with the detailed estimate is provided which is based on PRICE
- 6.3 The lumpsum, unforeseen etc. shall not be considered for the funding from KIIFB. Rate of KWA SoR items for the materials is increased by 16% which is not substantiated but is assumed to be 1% water charges and 15% contractors profit which is applied on the basic rates whose applicability shall be based on the relevant rules prevailing in the concerned department and state.
- 6.4 The following are the costs under various heads:



Specification	Estimate Cost (In Lakhs)	Recommended Cost (In Lakhs)	Remarks
Cost of materials	Rs. 518.32	Rs. 518.32	
Working Charges	Rs. 117.63	Rs. 117.62	
Road restoration charges	Rs. 73.46	Rs. 73.46	Shall be based on actuals
Lumpsum for round off	Rs. 0.59	-	Not considered for funding
Total	Rs. 710.00	Rs. 709.40	

Recommended Cost – Rs. 709.40 Lakhs

PROJECT 2

- 6.5 The estimation of the various components is based on DSR and KWA SoR. For items, not available in SoR, recently approved rates by local competent authorities of KWA have been adopted. The road restoration charges by PWD is provided for reference but the same issued for BMBC restoration is not provided (Issued by Chief engineer-NH).
- 6.6 The abstract/bill of quantities with the detailed estimate is provided which is based on PRICE
- 6.7 The lumpsum, unforeseen etc. shall not be considered for the funding from KIIFB. Rate of KWA SoR items for the materials is increased by 16% which is not substantiated but is assumed to be 1% water charges and 15% contractors profit which is applied on the basic rates whose applicability shall be based on the relevant rules prevailing in the concerned department and state.
- 6.8 The following are the costs under various heads:

Specification	Estimate Cost (In Lakhs)	Recommended Cost (In Lakhs)	Remarks
Cost of materials	Rs. 405.19	Rs. 405.19	
Working Charges	Rs. 139.73	Rs. 139.73	
Road restoration charges	Rs. 42.37	Rs. 42.37	Shall be based on actuals
Unforeseen	Rs.12.71	-	Unforeseen shall not be considered
Total	Rs. 600.00	Rs. 587.29	

Recommended cost: Rs. 587.29 Lakhs



PROJECT 3

- 6.12 The estimation of the various components is based on DSR and KWA SoR. For items, not available in SoR, recently approved rates by local competent authorities of KWA have been adopted. The road restoration charges by PWD is provided for reference but the same issued for BMBC restoration is not provided (Issued by Chief engineer-NH).
- 6.13 The abstract/bill of quantities with the detailed estimate is provided which is not based on PRICE
- 6.14 The lumpsum, unforeseen etc. shall not be considered for the funding from KIIFB. The lumpsum provision taken for the specials in the cost of material shall be based on the actual requirements/materials needed rather than the percentage adopted.
- 6.15 The following are the costs under various heads

Specification	Estimate Cost (In Lakhs)	Recommended Cost (In Lakhs)	Remarks
Cost of materials	Rs.17.30	Rs. 17.12	LS for unforeseen not considered
Working Charges	Rs. 12.40	Rs. 12.40	
Road restoration charges	Rs. 6.30	Rs. 6.16	Round off amount not considered & Shall be based on actuals
Total	Rs. 36.00	Rs. 35.68	

Recommended cost: Rs. 35.68 Lakhs

PROJECT 4

- 6.16 The estimation of the various components is based on DSR and KWA SoR. For items, not available in SoR, recently approved rates by local competent authorities of KWA have been adopted. The road restoration charges by PWD is provided for reference but the same issued for BMBC restoration is not provided (Issued by Chief engineer-NH).
- 6.17 The abstract/bill of quantities with the detailed estimate is provided which is not based on PRICE
- 6.18 The lumpsum, unforeseen etc. shall not be considered for the funding from KIIFB. The lumpsum provision taken for the specials in the cost of material shall be based on the actual requirements/materials needed rather than the percentage adopted.
- 6.19 The following are the costs under various heads:



Specification	Estimate Cost (In Lakhs)	Recommended Cost (In Lakhs)	Remarks
Cost of materials	Rs.22.00	Rs. 22.00	
Working Charges	Rs. 16.00	Rs. 12.40	
Total	Rs. 38.00	Rs. 34.40	

Recommended cost: Rs. 34.40 Lakhs

PROJECT 5

- 6.20 The estimation of the various components is based on DSR and KWA SoR. For items, not available in SoR, recently approved rates by local competent authorities of KWA have been adopted. The road restoration charges by PWD is provided for reference but the same issued for BMBC restoration is not provided (Issued by Chief engineer-NH).
- 6.21 The abstract/bill of quantities with the detailed estimate is provided which is based on PRICE
- 6.22 The lumpsum, unforeseen etc. shall not be considered for the funding from KIIFB. The lumpsum provision taken for the specials in the cost of material shall be based on the actual requirements/materials needed rather than the percentage adopted.
- 6.23 The following are the costs under various heads

Specification	Estimate Cost (In Lakhs)	Recommended Cost (In Lakhs)	Remarks
Cost of materials	Rs. 25.90	Rs.25.24	LS for unforeseen not considered
Working Charges	Rs. 6.20	Rs. 6.20	
Road restoration charges	Rs. 4.90	Rs. 4.90	Shall be based on actuals
Total	Rs. 37.00	Rs. 36.34	

Recommended cost: Rs. 36.34 Lakhs

PROJECT 6

- 6.24 The estimation of the various components is based on DSR and KWA SoR. For items, not available in SoR, recently approved rates by local competent authorities of KWA have been



adopted. The road restoration charges by PWD is provided for reference but the same issued for BMBC restoration is not provided (Issued by Chief engineer-NH).

- 6.25 The abstract/bill of quantities with the detailed estimate is provided which is not based on PRICE
- 6.26 The lumpsum, unforeseen etc. shall not be considered for the funding from KIIFB. The lumpsum provision taken for the specials in the cost of material shall be based on the actual requirements/materials needed rather than the percentage adopted.
- 6.27 The following are the costs under various heads:

Specification	Estimate Cost (In Lakhs)	Recommended Cost (In Lakhs)	Remarks
Cost of materials	Rs. 460.0	Rs.442.23	LS for unforeseen not considered
Working Charges	Rs. 220.00	Rs. 209.79	Unforeseen items not considered
Road restoration charges	Rs. 45.00	Rs. 35.99	LS for unforeseen not considered & Shall be based on actuals
Total	Rs. 725.00	Rs. 688.01	

Recommended cost: Rs. 688.01 Lakhs

PROJECT 7

- 6.28 The estimation of the various components is based on DSR and KWA SoR. For items, not available in SoR, recently approved rates by local competent authorities of KWA have been adopted. The road restoration charges by PWD is provided for reference but the same issued for BMBC restoration is not provided (Issued by Chief engineer-NH).
- 6.29 The abstract/bill of quantities with the detailed estimate is provided which is not based on PRICE
- 6.30 The lumpsum, unforeseen etc. shall not be considered for the funding from KIIFB. The lumpsum provision taken for the specials in the cost of material shall be based on the actual requirements/materials needed rather than the percentage adopted.
- 6.31 The following are the costs under various heads:



Specification	Estimate Cost (In Lakhs)	Recommended Cost (In Lakhs)	Remarks
Cost of materials	Rs. 360.00	Rs.355.50	Market fluctuations, LS for unforeseen not considered
Working Charges	Rs. 170.00	Rs. 167.35	Unforeseen items not considered
Road restoration charges	Rs. 55.00	Rs. 53.61	LS for unforeseen not considered & Shall be based on actuals
Total	Rs. 585.00	Rs. 576.46	

Recommended cost: Rs. 576.46 Lakhs

PROJECT 8

- 6.32 The estimation of the various components is based on DSR and KWA SoR. For items, not available in SoR, recently approved rates by local competent authorities of KWA have been adopted. The road restoration charges by PWD is provided for reference but the same issued for BMBC restoration is not provided (Issued by Chief engineer-NH).
- 6.33 The abstract/bill of quantities with the detailed estimate is provided which is not based on PRICE
- 6.34 The lumpsum, unforeseen etc. shall not be considered for the funding from KIIFB.
- 6.35 The lumpsum provision taken for the specials in the cost of material shall be based on the actual requirements/materials needed rather than the percentage adopted.
- 6.36 The following are the costs under various heads:

Specification	Estimate Cost (In Lakhs)	Recommended Cost (In Lakhs)	Remarks
Cost of materials	Rs. 425 .00	Rs.414.62	LS for unforeseen not considered
Working Charges	Rs. 210.00	Rs. 198.07	Unforeseen items not considered
Road restoration charges	Rs. 92.00	Rs. 90.17	LS for unforeseen not considered & Shall be based on actuals



Total	Rs. 727.00	Rs. 702.86	
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Recommended cost: Rs.702.86 Lakhs

PROJECT 12

- 6.40 The estimation of the various components is based on DSR and KWA SoR. For items, not available in SoR, recently approved rates by local competent authorities of KWA have been adopted. The road restoration charges by PWD is provided for reference but the same issued for BMBC restoration is not provided (Issued by Chief engineer-NH).
- 6.41 The abstract/bill of quantities with the detailed estimate is provided which is not based on PRICE
- 6.42 The lumpsum, unforeseen etc. shall not be considered for the funding from KIIFB. The lumpsum provision taken for the specials in the cost of material shall be based on the actual requirements/materials needed rather than the percentage adopted.
- 6.43 The following are the costs under various heads:

Specification	Estimate Cost (In Lakhs)	Recommended Cost (In Lakhs)	Remarks
Cost of materials	Rs. 32.00	Rs.31.14	LS for unforeseen not considered
Working Charges	Rs. 7.00	Rs. 7.00	
Total	Rs. 39.00	Rs. 38.14	

Recommended cost: Rs. 38.14 Lakhs

7. REVENUE STREAMS

PROJECT 1

- 7.1 Due to the effective potable water supply distributions, more water connections are expected during the completion of the project.
- 7.2 Revenue can be increased by at least 30%.
- 7.3 With the replacement of the existing damaged pipes, the annual maintenance used for the repair works is expected to reduce

PROJECT 2



- 7.4 The revenue stream for the project is detailed in the report which is substantiated based on reasonable assumptions for cost and the usage.
- 7.5 On the completion of these projects, more water connections are expected.
- 7.6 Revenue can be increased by at least 40%.
- 7.7 The annual maintenance used for the repair works is expected to reduce by replacing the existing damaged pipes.

PROJECT 3, PROJECT 4, PROJECT 5, PROJECT 6, PROJECT 7, PROJECT 8, PROJECT 12

- 7.8 Revenue can be increased by at least 30%

8. COST BENEFIT ANALYSIS

- 8.1 The Cost Benefit Analysis is furnished in the DPR and the cost benefit ratio is 0.729.
- 8.2 CBA shall be done in a realistic data relevant to the project.

9. VALUE ENGINEERING OPTIONS

- 9.1 In most of the projects, DI K9 pipes are proposed to be used and this is based on the prevailing KWA policy.
- 9.2 The dimension of the trenches proposed for the relaying and used in the financial estimates are based on the KWA data book

10. IMPLEMENTATION SCHEDULE & WBS

- 10.1 The implementation schedule proposed for all the projects along in form of a bar chart is provided in the report.
- 10.2 The duration of the proposed projects are as follows
 - Project 1 – 8 months
 - Project 2 - 8 months
 - Project 3 – 6 months
 - Project 4 – 6 months
 - Project 5 – 6 months
 - Project 6 – 12 months
 - Project 7 – 12 months
 - Project 8 – 12 months



Project 12-9 months

11. PROJECT MANAGEMENT ORGANIZATION STRATEGY

- 11.1 The organizational chart and the hierarchy of the PMU proposed by KWA is provided in the report.
- 11.2 The roles and responsibilities of the proposed project management unit is provided in the report

12. CONTRACT MANAGEMENT STRATEGY

- 12.1 The projects are proposed to be carried out be item rate contract to private contractor. The e-Tendering and e-Procurement system is implemented by KWA.
- 12.2 The contract is as per KWA policies which mostly follows the public works manual standard of the state
- 12.3 The clauses which are in addition to this are detailed in the report.

13. STATUTORY CLEARANCES

- 13.1 The proposed project requires permission for road cutting from PWD/Local Bodies

14. ENVIRONMENTAL ASPECTS & SUSTAINABILITY

- 14.1 Since the project area is topographically situated in an elevated and undulated area, the ground water level is depleted to alarming depths.
- 14.2 During monsoon periods, there is less water scarcity.
- 14.3 The general population in the region for the most part rely upon treated water of KWA
- 14.4 No environmental impacts shall occur during the execution of the project

15. QUALITY MANAGEMENT PLAN

- 15.1 KWA is responsible for ensuring quality of construction
- 15.2 Factory pipe testing will be conducted prior to procurement
- 15.3 After laying, field pressure tests will be conducted for each 200m.
- 15.4 For quality assurances, third party inspection will be arranged by KWA.
- 15.5 For ensuring the quality of execution, field supervision will be conducted by KWA officials.



16. RISK ASSESSMENT AND MITIGATION MEASURES

- 16.1 The following risk were assessed
- Damages to road
 - Dust problem during the execution
 - Injuries caused to the people involved in pipe laying
 - Accidents
- 16.2 The mitigation measures for the above are detailed in the report.

17. REMARKS & INFERENCES

- 17.1 The DPRs contain necessary details including item wise details, water supply scheme, detailed estimate etc.
- 17.2 The parameters studied regarding the demand are in favor of the proposed projects.
- 17.3 The functional design has been attempted.
- 17.4 The engineering design has been attempted.
- 17.5 The O& M strategy proposed is satisfactory.
- 17.6 The estimate is prepared based on KWA SoR, DSR 14 and market rates. The applicability and correctness of para 6.1 and 6.3 shall be responsibility of the TS authority or department.
- 17.7 Potential revenue streams have been identified as savings in maintenance cost and additional sale of water which is expected to be saved due to replacement.
- 17.8 The investment criteria (CBR) have been documented.
- 17.9 No value engineering options seems to be attempted as the option chosen is based on KWA policy.
- 17.10 WBS is based on the rational sequencing of activities Details of cash flow not seen attached in the WBS.
- 17.11 The project management organization plans seem satisfactory.
- 17.12 The contract management plans are acceptable provided the documents and procedures are not in conflict with any of the rules and regulations regarding public works execution prevailing in Govt of Kerala.
- 17.13 Explanations regarding the statutory clearances are acceptable.
- 17.14 No major environmental aspects are noted. The projects are beneficial to the people who are dependent on pipelines for drinking water.
- 17.15 The quality management plans are acceptable.



17.16 The risk management plan shall be one which eliminates and mitigates all time and cost overrun risk elements.

18. RECOMMENDATIONS & SUGGESTIONS

- 18.1 The project may be considered for funding by KIIFB subject to the execution of tripartite agreement.
- 18.2 The amount works out to be **Rs. 34.07 Crore** as per the split below.
- Project 01 – Rs. 7.09 Crore
 - Project 02 – Rs. 5.87 Crore
 - Project 03 – Rs. 0.36 Crore
 - Project 04 – Rs. 0.34 Crore
 - Project 05 – Rs. 0.36 Crore
 - Project 06 – Rs. 6.88 Crore
 - Project 07 – Rs. 5.76 Crore
 - Project 08 – Rs. 7.03 Crore
 - Project 12 – Rs. 0.38 Crore
- 18.3 The Technical Sanction shall be issued by the competent authority by ensuring the reasonableness of the rates adopted in the estimate by comparing with the rates of equivalent items in PRICE. The detailed estimate shall also be checked against the designs and drawings developed for each project. Documentary evidence of these actions shall be communicated to KIIFB prior to acceptance of tenders.
- 18.4 The payment for the road restoration shall be based on actuals and the applicability of taxes, excise duties etc. shall be as per the prevailing rules/policies applicable to GoK/KWA/KIIFB.
- 18.5 The Technical sanction by competent authority is mandatory before schedules are added to the Tripartite agreement.
- 18.6 The cost provisions for work alone shall be utilized for execution of work. The savings or anticipated savings shall not be re appropriated for meeting expenditure of work proper.
- 18.7 While entrusting the maintenance activities to the contractor, it shall be ensured that the obligation under defect liability shall be performed without any additional cost. Hence no maintenance expenditure is considered under the original work.