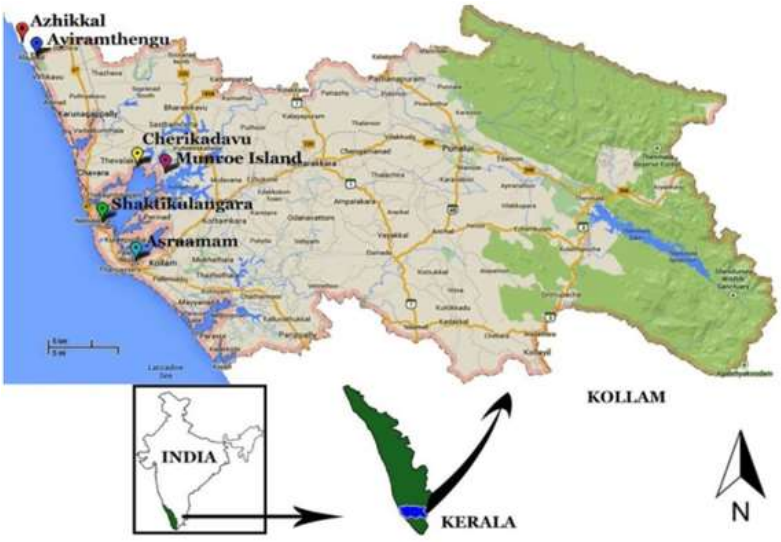
KERALA WATER AUTHORITY

DETAILED PROJECT REPORT FOR SEWERAGE NETWORK IN KUREEPUZHA WEST AND VALLIKEEZHU DIVISIONS OF KOLLAM CORPORATION



PPD & SEWERAGE CIRCLE
THIRUVANANTHAPURAM
DECEMBER 2022

CONTENTS

ACKNOWLEDGEMENT……..... 2

EXECUTIVE SUMMARY…….…… 3

PROJECT AT A GLANCE……...…… 5

ABSTRACT OF ESTIMATE…….. 6

CHAPTER 1 INTRODUCTION……..... 7

CHAPTER 2 PRESENT STATUS…… 15

CHAPTER 3 PROJECT AREA AND PLAN…….. 16

CHAPTER 4 PLANNING, DESIGNING AND LAYING OF SEWERAGE NETWORK… 17

DETAILED ESTIMATE…… 34

APPENDIX 1 - SEWERAGE NETWORK DESIGN

APPENDIX 2 – DRAWINGS

ACKNOWLEDGEMENT

We wish to express our sincere gratitude to the Additional Chief Secretary (WRD) Dr. V Venu IAS, Secretary (WRD) Sri. Pranabjyothi Nath IAS, Chairman KWA, Sri. Venkatesapathy S. IAS, Managing Director, KWA, Sri. Sreekumar G. Technical Member, KWA, Sri. Jayaprakash C, Chief Engineer, PPD-WASCON & Sewerage Works, for the valuable guidance and support.

We express our gratitude to the authorities of Kollam Corporation for their support, without which this endeavor would not have been possible. We express our gratefulness to all the staff of PPD Camp Office, Kollam for their valuable support and hard work. At this juncture, we also wish to thank everyone directly and indirectly involved in making the detailed project report a reality.

We trust that the project will become a reality and it would be beneficial to reduce the pollution load on Kollam Corporation and improve people's living standards in the project area.

Assistant Engineer
PPD Camp Office
Kerala Water Authority
Vellayambalam, Thiruvananthapuram

ASSISTANT EXECUTIVE ENGINEER II
PPD & Sewerage Circle
Kerala Water Authority
Jalabhavan, Vellayambalam
Thiruvananthapuram-33

Executive Engineer,
PPD & Sewerage Circle,
Jalabhavan,
Kerala Water Authority,
Thiruvananthapuram

Superintending Engineer,
PPD & Sewerage Circle,
Jalabhavan,
Kerala Water Authority,
Thiruvananthapuram

EXECUTIVE SUMMARY

The Kerala Water Authority (KWA) was constituted by the Government of Kerala through the Kerala Water Supply and Waste Water Ordinance 1984 converting the then existing Public Health Engineering Department. The ordinance was replaced by the Kerala Water Supply and Sewerage Act 1986 (Act 14 of 1986) and the organization was deemed to have come into force on the 1st day of March 1984. The Act provides for the establishment of an autonomous Authority for the development and regulation of water supply and wastewater collection and disposal in the State of Kerala and for matters connected therewith. The Authority was established by vesting the properties and assets of the erstwhile Public Health Engineering Department under section 16 of the Act

Kollam district was formed in 1956, November 1. The district is home to more than 7.89% of total population of the state.and the district is located between 8 °53'35.5632"N and 76°36'50.9148"E.Kollam district shares boundaries with Alappuzha and Pathanamthitta Districts in the North, Thiruvananthapuram District in the South, Tirunelveli District of Tamil Nadu in the East and Arabian sea on the west

The Kollam Municipal Corporation consists of 55 Divisions and the area is 57.28 sq.km.Population according to Census 2011 is 3, 48,657. There were 1, 80,651 females and1, 68,006 males, giving sex ratio of 1075 female to 1000 male. The total literacy rate of the city population is 82%.

A sewerage system covering old municipal area comprising of 11 divisions was proposed for the district in 1980 but the same has not yet been completed. Subsequently the construction of pumping station and laying of sewerage network and pumping main was taken up using ADB fund under KSUDP. The work could not be completed due to public protests and road cutting issues. The construction of 12 MLD sewage treatment plant at Kureepuzha West Division was awarded in April 2020, covering 10 Divisions such as Thevally, Vadakkumbhagam, Asraamam, Kadappakkada, Cantonment, Thamarakkulam, Pallithottam, Port, Kacheri and Thankasseri.and the work is in progress Administrative sanction for the work of rehabilitation of existing sewerage system and extension of sewerage system for laying collection networks of Kollam Corporation was accorded for an amount of Rs.93.61 crores. Even after repeated tender calls, no offers were received. The estimates were revised with DSR2018 and also added additional provisions for HDD, steel shoring and safety provisions etc thereby escalating the cost of work from Rs.93.61 Crore to Rs. 136.36 Crore. But again, no offers were received. The construction of 12 mld STP at Kureepuzha west is

Considering the urgency in commissioning of the STP at Kureepuzha in Kollam Corporation, two new areas viz Kureepuzha west division in which the STP is located and the adjoining Vallikkeezhu division were selected and sewerage network design and DPR for these two Divisions are proposed here with for getting Administrative sanction under Amrut II. The project includes laying of sewerage network of 22.38 km, pumping main of 75m and construction of one number of collection well near 12 mld STP at Kureepuzha west. The sewage is collected by gravity through varies underground pipes of diameter 225 to 560mm HDPE pipe. Land for the development for the scheme should be arranged by local body administration. Necessary social awareness program as well as environment impact assessment studies have to be organized. **Total estimate amount comes to Rs. 76.62 crores** (including 5 year operation and maintenance cost).

Assistant Engineer
PPD Camp Office

ASSISTANT EXECUTIVE ENGINEER II
PPD Regional Office
Observatory Hills
Kerala Water Authority
Thiruvananthapuram - 33

Executive Engineer,
PPD & Sewerage Circle,
Jalabhavan,
Kerala Water Authority,
Thiruvananthapuram

Superintending Engineer,
PPD & Sewerage Circle,
Jalabhavan,
Kerala Water Authority,
Thiruvananthapuram

CHIEF ENGINEER
Sewerage, PPD & WASCON
Kerala Water Authority
Thiruvananthapuram -33

PROJECT AT A GLANCE

1.	Title of the Project	**Detailed project report for sewerage network of Kureepuzha west and Vallikkeezhu Division of Kollam Corporation**
2.	Details of project location	
	District	Kollam
	Taluk	Kollam
	Corporation/Municipality/Panchayath	Kollam Corporation
	Assembly Constituency	Kollam
3.	Implementing agency/SPV	Kerala Water Authority
4.	DPR prepared by	Sewerage Circle Thiruvananthapuram
7.	Nature of the project	Laying sewerage network in Kureepuzha west and Vallikkeezhu division of Kollam Corporation
10.	Present status any	Construction of 12 MLD Sewerage Treatment plant is progress and network has to be laid for commissioning of STP
11.	Need for the project	Necessary to have well planned sewerage network catering the needs of the population in Kureepuzha west adjoining Vallikkeezhu division
12.	Details of proposed scheme	
	Sewer pumping stations	A collection well at MammoottilKadavu
	Diameter of pipes	560mm, 450mm, 355mm, 280mm 225mm HDPE pipes
13.	Details of investigations/surveys conducted	Topographical Survey conducted
14.	Total project cost including 5 year operation and maintenance cost	**Rs. 76.62 crores**

CHIEF ENGINEER
Sewerage, PPD & WASCON
Kerala Water Authority
Thiruvananthapuram -33

Executive Engineer,
PPD & Sewerage Circle,
Jalabhavan,
Kerala Water Authority,
Thiruvananthapuram

Superintending Engineer
PPD & Sewerage Circle,
Jalabhavan,
Kerala Water Authority,
Thiruvananthapuram

ASSISTANT EXECUTIVE ENGINEER II
PPD Regional Office
Observatory Hills
Kerala Water Authority
Thiruvananthapuram - 33

ABSTACT OF ESTIMATE

General Abstract		
Sewerage Network - Kureeppuzha west and Vallikkeezhu wards to be connected to 12 MLD STP at Kureeppuzha		
Sl No	Heading Description	Amount
1	Kureeppuzha west and Vallikkeezhu wards to be connected to 12 MLD STP at Kureeppuzha-Providing and Laying of HDPE PE-100/PN-8 pipe for Sewer Network and Construction of Manhole Chamber	484478825.18
2	Sewerage Network design- Kureeppuzha west and Vallikkeezhu wards to be connected to 12 MLD STP at Kureeppuzha-Construction of Sewerage collection Well and Pump house at near STP at Kureeppuzha and allied works	14838180.70
3	Sewerage Network design- Kureeppuzha west and Vallikkeezhu wards to be connected to 12 MLD STP at Kureeppuzha-Supplying,Laying,Testing and Commissioning of 200mm DI K9 Sewer Pumping main from collection well to 12 MLD STP at Kureeppuzha	3849816.83
4	Providing House service connections,SCADA & Automation,Installation of Pump Sets,Installation of Solar Power Plant,DG sets etc and allied works	63900359.03
5	Provisional Sums (i.e. Statutory payments for Electricity Connection,Power line extension, Damages to Structures, Utility shifting,IEC activities and Inspection vehicle etc.	2500000.00
6	Operation, Maintenance and Management Services for 5 years including 18% GST	20804729.00
7	Centage (10% of Total 1 to 6)	59037191.00
8	DPR Preparation Charge (2.5% of Total 1 to 5)	14239180.00
9	GST Payments(18% of Total 1 to 5)	102522093.00
	Total	**766170374.74**
	Lumpsum for round off	**29625.26**
	GRAND TOTAL Rs	**766200000.00**
	Rounded Grand Total Rs 76,62,00,000	
	Rupees Seventy Six Crore and Sixty Two Lakh Only	

CHIEF ENGINEER
Sewerage, PPD & WASCON
Kerala Water Authority
Thiruvananthapuram -33

CHAPTER 1
INTRODUCTION

Kollam is one of most picturesque parts of Kerala. Kollam Municipal Corporation was established on Ist October 2001. It is a land of agriculture and small scale industries. The area of Kollam Municipal Corporation is 57.28 sq.km and population according to Census (2011) is 3, 48,657. There were 1, 80,651 females and 1, 68,006 males, giving sex ratio of 1075 female to 1000 male. The total literacy rate of the city population is 82%.

Kollam was an international emporium of trade and even now it is a prosperous commercial centre. Some of the major employers in the public sector are Indian Rare Earths (IRE), Kerala Metals and Minerals Limited at Chavara. It is situated about 72 kms North of Thiruvananthapuram and is linked by rail, road and back water transport. The town edges with the famous Ashtamudi Lake. It is also the head quarters of the Kerala State Cashew Development Corporation

A new sewerage system covering old municipal area comprising of 11 divisions was proposed in 1980 for the district but the same has not yet been completed. Subsequently the construction of pumping station and laying of sewerage network and pumping main was taken up using ADB fund under KSUDP, An amount of Rs.60.35 Crores was allotted for executing the above project in 2012. Due to the price escalation, the above project cost was increased to 80.96 Crores in 2015. Also the work could not be completed due to public protests and road cutting issues. Construction of 12 MLD sewerage treatment plant at Kureepuzha was aDivisioned in April 2020, covering 10 Divisions such as Thevally, Vadakkumbhagam, Asraamam, Kadappakkada, Cantonment, Thamarakkulam, Pallithottam, Port, Kacheri and Thankasseri. The work is in progress. Sewer loads generated from individual households, commercial establishments, public institutions of 10 Division where proposed to be collected from the source nodes and carried through pipes to the nearest manholes, then to collection wells and to the 12 MLD sewerage Treatment Plant at Kureepuzha. Administrative sanction for rehabilitation of existing sewerage system and extension of sewerage system for laying sewerage networks was accorded for an amount of Rs.93.61 crores. Even after repeated tender calls, no offers were received. The estimates were revised with DSR2018 and also added additional provisions for HDD, steel shoring and safety provisions etc thereby escalating the cost of work from Rs.93.61 Crore to Rs. 136.36 Crore. But again, no offers received. Hence for the commissioning of the STP a new network in Kureepuzha west Division and Vallikkezhu Division of the Corporation are proposed.

CHAPTER 2
PRESENT STATUS

PRESENT STATUS

The KWA is the largest institutional entity in the field of water supply, and implemented thousands of small, medium and large urban and rural piped water supply schemes in Kerala. However, the presence of KWA in the field of sewerage schemes has been limited. Due to the growing needs of planning and design of systems which serves healthy environment, the role of sewerage systems with meticulous planning and design is a must. Moreover, there are National Green Tribunal Interventions and guidelines for pollution abatement for natural water bodies and environment. All these factors paved the way for the proposal of sewerage schemes which can cover every human habitation for the entire State of Kerala in a scientific and systematic way. KWA as knowledge partner, service provider and central agency for coordinating the activities related to the planning and implementation of sewerage systems for LSGDs can contribute in many ways.

The Unplanned urbanization, Unorganized Sewage Management and the resulting pollution of Water resources has become a complex challenge to the Environment as well as to the Public Health. Governments in recent years have made much deliberations and initiatives to address the situation. Due to the growing needs of planning and design of systems which serves healthy environment, the role of sewerage systems with meticulous planning and design is a must. Moreover the Hon'ble National Green Tribunal have directed (OA No;148/2016, Mahesh Chandra Saxena Vs South Delhi Municipal Corporation & Others, Dated 10-05-2019) all the States and Union Territories in India to prepare and furnish their action plans within three months to the Central Pollution Control Board so that they could review the same and issue further directions. All these factors paved the way for the proposal of sewerage schemes which can cover every human habitation for the entire State of Kerala in a scientific and systematic way

The construction of 12 MLD STP at Kureepuzha is nearing completion and expected to be commissioned in 3/2023. But the sewerage network carrying sewage to the STP is not yet completed. The work of rehabilitation of existing sewerage system and extension of sewerage system for laying collection networks of Kollam Corporation was primarily divided into two zones SS01 & SS02. Even after repeated tender calls, no offers were received and then the work was divided into four packages and tendered again. However, no offers were received to these tenders also. The estimates were revised with DSR2018 and also added additional provisions for HDD, steel shoring and safety provisions etc thereby escalating the cost of work

from Rs.93.61 Crore to Rs. 136.36 Crore. But again, no offers received. Considering the urgency in Commissioning of the STP two new areas viz Kureepuzha west Division in which the STP is located and the adjoining Vallikkeezhu Division were selected and sewerage network design and DPR for these two Divisions are proposed for getting Administrative sanction under Amrut II.

.

Project Genesis

The project proposal is for the implementation of sanitary sewage disposal in Kureepuzha and Vallikkeezhu Divisions of Kollam District. The project will be carried out through KWA, subject to the approval of the District Administration. The project proposal envisages a well planned sewerage network system for these two Divisions and also a plan for 10 years operation and maintenance of the system. The control of pollution of natural water bodies especially Ashtamudi lake will be possible by the implementation of this project.

a) Study Organized

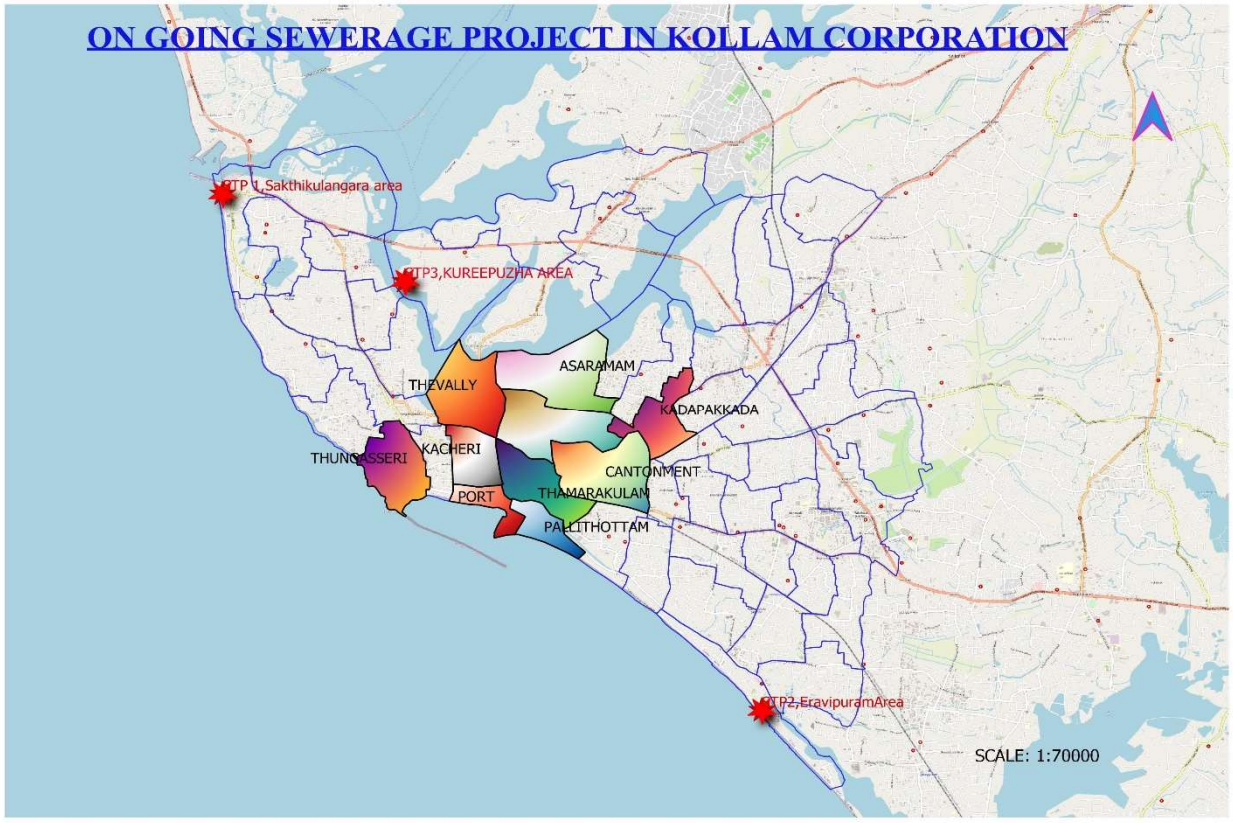
The PPD wing of KWA especially the district team camped at Kollam carried out the preliminary study and data collection for preparation of the project proposal. GIS enabled data are being used and processed along with information available from open source.

b) Scope and Status of the Report

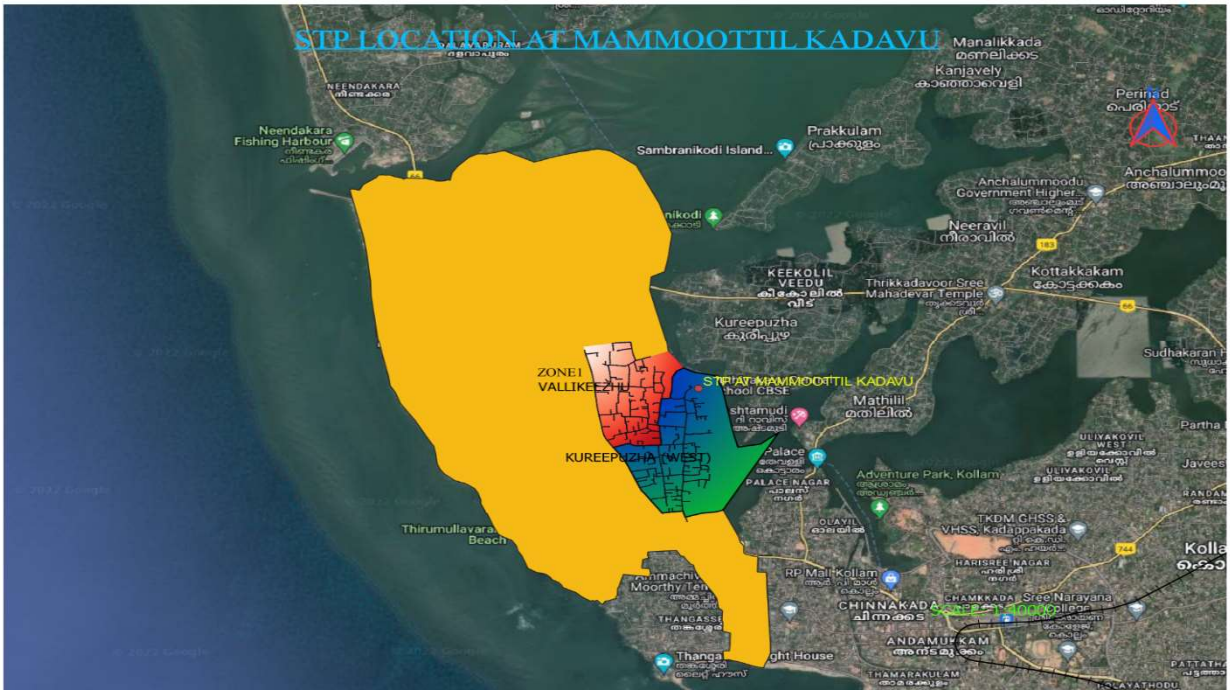
This is only a preliminary report intended for the approval and according of Administrative Sanction from the Authority / Department. A feasibility assessment is carried out with available data. Detailed study has to be carried out further for the feasibility and viability assessment before proceeding to arrangement of tenders.

c) Project Area

Kollam Corporation consists of 55 Division. The Sewerage treatment plant being constructed at Mammoottilkadavu in Kureepuzha west was envisaged to cater to the needs of 10 Division of the Corporation viz. Thangassery, Port, Kacheri, Thevally, Asramam, Vadakkumbhagam, Kadappakkada, Cantonement, Thamarakkulam, and Pallithottam. Remaining 45 Municipal Divisions are divided into five zones for convenience of preparation of project proposal. The proposed project area in this report (Kureepuzha west and Vallikkezhu) consist in Zone 1.



Network areas proposed for the ongoing sewerage system

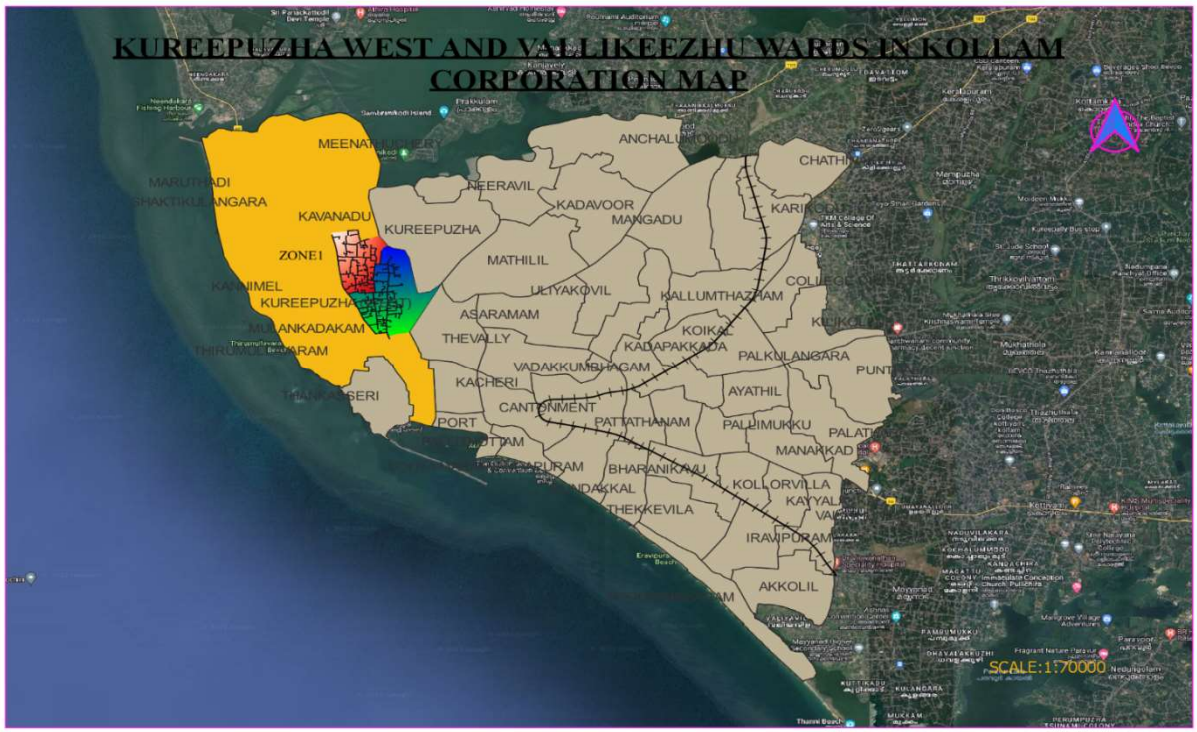


Kureepuzha west and Vallikkeezhu Divisions with location of STP at Mammoottilkadavu in Kureepuzha (Newly proposed)

Population of Kureepuzha west Division		
As per census 2011 Population	2011	7100
Population Projected to year	2024	7300
Total population to Design	2054	7745
Population of Vallikkeezhu Division		
As per census 2011 Population	2011	5900
Population Projected to year	2024	6100
Total Design Population	2054	6300

Kureepuzha is a peninsula region in the city of Kollam, Kerala, located on the Shore of Ashtamudi Lake. It is one among the 55 councils of Kollam Municipal Corporation (KMC). Kerala's only turkey farm and a regional poultry farm are at Kureepuazha. Kollam city's waste management plant is also situated at Kureepuzha.

Vallikkeezhu is a neighborhood situated at the northern region of Kollam city. It is about 5km away from Chinnakada.



Kureepuzha and Vallikkeezhu Divisions with the proposed network

CHAPTER 3
PROJECT AREA AND PLAN

PRESENT PROPOSAL

The present proposal includes

1. Laying sewerage network in Kureepuzha west Division and Vallikkeezhu Division of Kollam Corporation for a length of 2238m
2. Construction of collection well at Mammoottilkadavu near 12 mld STP
3. Submersible wet well pump sets in the Collection well
4. Laying pumping main for a length of 75m from the collection well to the STP

BACKGROUND AND PROJECT GENESIS

Kerala Water Authority (KWA) was established on 1 st April 1984 under the Kerala Water and Wastewater ordinance, 1984 by converting the erstwhile Public Health Engineering Department to provide for the development and regulation of water supply and wastewater collection and disposal in the State of Kerala and for matters connected there with. To effectively address the emerging need of wastewater management, a Sewerage Vertical wing has been created in KWA with Chief Engineer, Project Planning Development unit, WASCON and Sewerage as its head.

KWA as a knowledge partner, service provider and a central agency for coordinating the activities related to the planning and implementation of sewerage systems for Local Self Government Institutions (LSGIs) can contribute in many ways. In the State of Kerala, KWA is providing sewerage system partly in Thiruvananthapuram and Kochi Corporations and a Sewerage system for Guruvayur Municipality has been completed

Under the Sewerage Vertical of KWA, there are four sewerage circle units located at Thiruvananthapuram, Kochi, Thrissur, and Kozhikode. Sewerage Circle, Thiruvananthapuram deals with activities in Thiruvananthapuram, Kollam, Pathanamthitta and Kottayam Districts

The present work consists of laying sewerage network system in Kureepuzha west and Vallikkeezhu Divisions of Kollam Corporation.

NEED FOR A SEWAGE TREATMENT SYSTEM

Environment protection has become the most important aspect in the present era of sustainable development. With uncontrolled urbanization, contamination of drinking water sources by sewage and septage has become a major threat to public health and safety. Direct discharge of

sewage to the water courses and discharges of septic tank effluents to the stream and canals polluted the entire water course.

Safe water supply and hygienic sanitation facilities are the two basic essential amenities for healthy living. In the developing world, sanitation has always been more unfortunate than its twin brother water supply. The water supply will have a measurable impact on health only if it is linked with sanitation facilities.

Kollam District at a glance

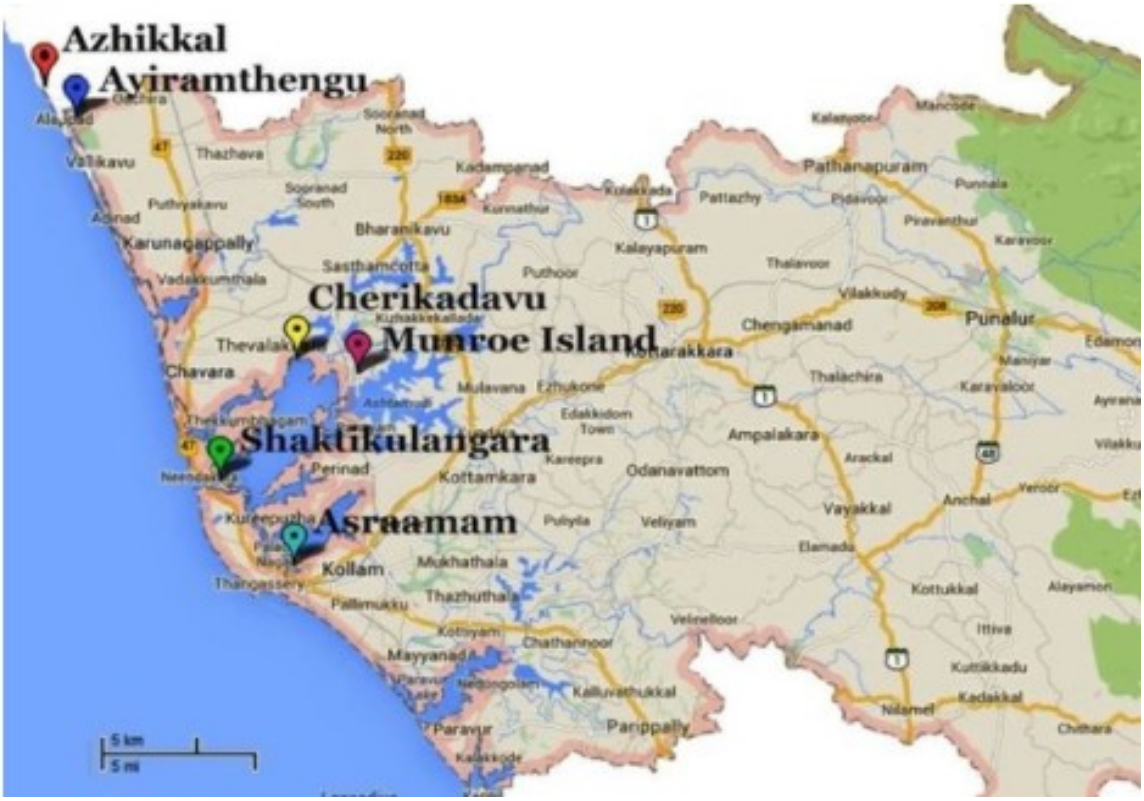
Area	**2491Km^2**	Kollamdistrict was created in 1956, November 1
Population (Census 2011)	26,35,375	
Decadal growth rate	1.94 %	
Population density	1061/ Km^2	
Households	5,46,095	
LA Constituencies	11	
Corporation	1	Kollam Corporation
Municipalities	4	Kottarakkara, Punaloor, Paravoor and Karunagappally
Grama Panchayaths	69	
Rivers	3	Major rivers(Achankovil, Kallada and Ithikkara,)
Average Rainfall	2468 mm	Average Rainfall

The district is divided into six sub districts namely Kollam, Kottarakkara, Pathanapuram, Karunagappally, Punaloor, Kunnathoor. The urban bodies in the district are the Kollam Corporation, 4 Municipalities, namely Kottarakkara, Punaloor, Paravoor and Karunagappally and 69 Grama panchayaths. The district is composed of two revenue divisions, viz, Kollam and Punalur.

Map of Kollam District

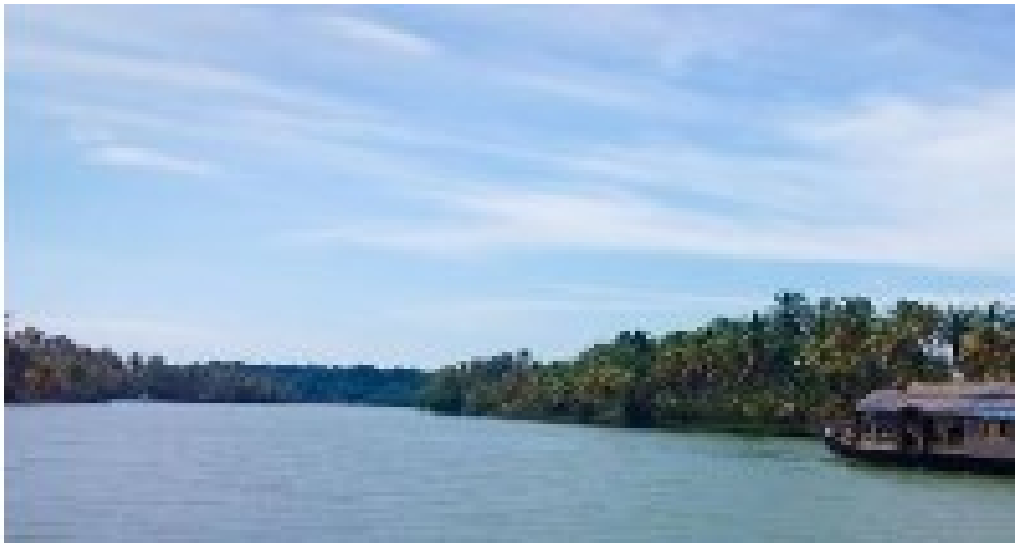
The district has three major rivers (Achankovil, Kallada and Ithikkara) 4 lakes (Ashtamudy lake, KalladaKayal, Paravoor Lake and Sasthamcotta freshwater Lake) and a large number of ponds. Sasthamcotta and Ashtamudi are wetlands of national importance located in Kollam district. The district is blessed with the largest fresh water lake in the State namely the Sasthamkotta Lake and is one of the resources which cater to the drinking water needs of Kollam district.

Kollam district consist of four regions i) Quilon Coast ii) Adoor Rolling Plain iii) Kottarakkara Undulating Upland iv) Kulathupuzha Forested Hills. The first region Quilon coast lies all along the coast of the district and is bounded by the Alleppey coast in the North, Adoor Rolling Plain and Kottarakkara Undulating Upland in the East, Trivandrum coast in the South and the Lakshadweep Sea in the West. The Quilon coast comprises of the whole of Karunagappally taluk and parts of Kunnathur and Quilon taluks. The highest point lies in West Kallada village of Kunnathurtaluk.



Map of India showing location of Kollam

Kollam is the capital of Kerala's cashew industry from the time of the Portuguese in the 16th century. Having hundreds of cashew factories in the district, Kollam still continues to be the largest processed cashew exporter in India. Neendakara and Thankasseri, the two fishing harbours and ports in Kollam, support a thriving marine industry providing a variety of employment and livelihood to people in large numbers.



Ashtamudilake

Plains, mountains, lakes, lagoons and back waters, forests, farmland and rivers make up the topography of the district. Administrative head quarters of Kollam District is Kollam, which is located 72 Kms from the state capital Thiruvananthapuram

Kollam Beach

Kaakkathuruthu

Its eastern region is forested, northern regions are mostly under rubber cultivation and the remaining areas grow mixed dry-land crops of coconut, plantain, and tapioca, among others. Coir production, handloom industry, clay and wood based industries contribute to the industries of the district. Built-up areas and rice fields complete the land use pattern

Thevally Palace

The district is climatically temperate with a generally sunny weather peaking in heat during April-May. Kollam has a considerably large forest cover on its eastern side making home for several eco tourism projects like Shenduruni, Thenmala, palaruvi, Kaakkathuruthu etc.

Thenmalaeco-tourism

Kollam has locations of historical importance like the Thangasseri light house, the St. Thomas Fort built by the Portugese, Thevally Palace, Cheenakkottaram etc. Besides, it is also the site of several old buildings constructed by the Travancore kings in a variety of architectural styles, where many government offices still function.

Sasthamcottah Lake

Necessary preliminary investigation on the pre-feasibility ofimplementing sewerage scheme to cover entire Kollam District including corporation area has been carried out by the PPD camp team of KWA in Kollam under the guidance of Regional office, Thiruvananthapuram.

Paalaruvi water falls

Population Pattern

The district covers an area of 2491 square kilometers. It is the seventh largest district in the state by population. As per 2011 census, it had a population of 26, 35,375, with a decadal growth of 1.94%. The population density is 1061 inhabitants per square kilometer.

Projection of Population

No	DISTRICT	No. of HH	Population as per 2011 census		
			Total	SC	ST
1	KOLLAM	669375	2635375	328263	10761

No	Particulars	Year	Quantity	Unit
1	Last census Population	2011	2635375	Persons
2	Decennial increase		1.94	%
3	Current year		2681389	
4	Design period		30	Years
5	Execution period		3	Years
6	Projected population	2054	2850105	Persons

Economic and Social Conditions

Kollam is famous as a city with excellent export background. Dairy farming is fairly well developed. Kollam is an important maritime and port city. Fishing has a place in the economy of the district. Neendakara and Sakthikulangara villages in the suburbs of the city have fisheries. An estimated 134,973 persons are engaged in fishing and allied activities

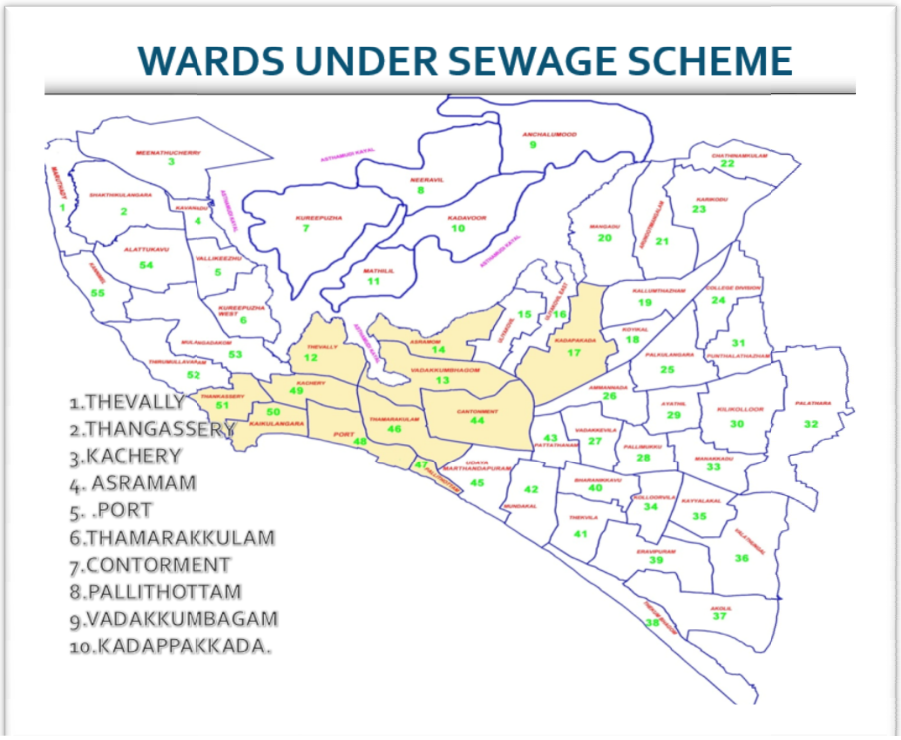
Neendakara Port

One-third of the state's fish catch is from Kollam. There are two Central Government industrial operations in the city, the Indian Rare Earths, Chavara and Parvathi Mills Ltd., Kollam. Kerala Ceramics Ltd. in Kundara, Kerala Electrical and Allied Engineering Company

in Kundara, Kerala Premo Pipe factory in Chavara, Kerala Minerals and Metals Limited in Chavara and United Electrical Industries in Kollam are Kerala Government-owned companies. The Kerala State Cashew Development Corporation Limited (KSCDC) is situated at Mundakkal in Kollam city. The company owns 30 cashew factories all across Kerala. Of these, 24 are located in Kollam district. Kollam is one of many seafood export hubs in India with numerous companies involved in the sector.

d) Existing Waste Water Disposal Systems and Population Served

Since planned system for sewerage disposal is not available, the water bodies get polluted. Water from Sasthamcotta lake is not sufficient for water supply, and so water is drawn from Kallada Irrigation Project canal along with Sasthamcotta Lake during drought period, before treatment. There is no sewerage system functioning at present, in Kollam District. Most of the houses have septic tank, pit latrine or other methods for disposal of sewage. Public comfort stations are inadequate.



Divisions covered in the existing sewerage scheme

EED FOR A PROJECT

It is quite evident that lack of a scientifically built sewerage system in the area causes poor sanitation, pollution of water bodies, unhygienic environment and much more difficulties as well as threats to the society. The septic tank, pit latrine and other means of existing practice is to be replaced with a better sanitation system for the houses in the area. A well planned sewerage network is essential for Kollam District. Once a plan for sewerage system has been made for the district, it will be easier for integrating various development plans involving multiple departments in this aspect.

CHAPTER 4
PLANNING, DESIGNING AND LAYING OF SEWERAGE NETWORK

4.1 GENERAL

The most common type of sewer construction practice involves the use of open trenches and prefabricated pipes. In the present project also, open trenches are planned for depths up to 2.3m.Total length of sewerage network proposed is 22.38 km for Kureepuzha and Vallikkeezhu Divisions. Sewer loads generated from individual households, commercial establishments, public institutions etc. is collected from the source nodes and carried through pipes to the nearest manholes. From there it is transported under gravity through a network of pipes to Divisions a collection well located near (75m) STP and from there it is pumped through a pumping main of 200mm diameter DI pipe to the Sewage Treatment Plant (STP) at Mammoottilkadavuin Kureepuzha. In situations where the depth of cutting exceeds 2.3m HDD method is proposed for laying the network.

It is proposed to lay sewers for about 2238 meters with pipe size ranging from 225 mm to 560 mm outer diameter and of Polyethylene material. Manholes are proposed at every 30 m interval and in every bends and road junction. Due to the special nature of the locality lifting stations are minimized. The STP under construction is of capacity 12 MLD. The network proposed at present for this STP is the core areas of Kureepuzha and Vallikkeezhu Divisions of the Corporation.

4.2 COMPONENTS OF SEWAGE NETWORK

The components of the sewage collection and carriage network consists of the following elements:

Sl No	Type of Element	Type of Material	Function
1	Chambers	Reinforced concrete	Collection of sewage from individual units for transferring to manholes
2	Sewer Pipelines	Polyethylene	Transfer of sewage by gravity flow from one point to other
3	Manholes	Reinforced concrete	Sewage collection points and inspection areas for removing blocks and cleaning of lines
4	Collection Well	Reinforced concrete	Centralised collection point for sewer load from a sub-zone in the project area
5	Pumping Station	Reinforced concrete	

Components of sewage network

4.3 DESIGN OF SEWAGE NETWORK

For the design of sewage network, hydraulic analysis was performed for the initially planned network and refined for a set of constraints and inflow values. The pipelines are designed for gravity flow conditions except for a pumping main from the collection well to the STP. Minimum outer diameter of the pipeline was taken as 225 mm outer diameter for main lines along the roads and with material as Polyethylene. The slope was taken as a minimum value of 1 in 250 in general and care has been taken to provide sufficient slopes to generate self cleansing velocities during peak flow conditions when the pipe is near to full in load. All stipulations given by the relevant Indian Standard Codes of practice and CPHEEO Manual have been adopted in design

4.3.1. CREATING PRIMARY MODEL FROM GEOGRAPHIC INFORMATION SYSTEMS (GIS)

Using GIS data available, the project area was examined thoroughly, and a primary model of sewer flow was generated. This model was later refined using reduced levels obtained from Differential Global Positioning System (DGPS) Real Time Kinematic Survey (RTK) values at the control points established in the primary model. The GIS provides information of population density scatter, presence of water bodies, road network and topographical features as a quick reference for planning an optimum site for the STP as well as the routing of sewer load

Proposed Divisions plotted in QGIS

All the existing manhole locations, well and STP were plotted in GIS for easy examination of the present conditions of the system. The STP is 75m away from the collection well. The design flow of sewage is 5.99 MLD at normal conditions. Total length of pipelines is 2238m. The smallest diameter of the pipeline is 225 mm made of polyethylene. There are 938 numbers of links of pipelines connecting two manholes. Average length of a link is 30 meters.

Proposed project is designed to collect the sewage water from the houses and commercial establishments and carry it to a suitable place for providing desired treatment before the wastewater being finally disposed off to low-laying area or reused for the purposes like irrigation, gardening, firefighting, industrial & institutional supply, or ground water recharge etc.

Satellite imagery of 12 MLD STP at Mammoottilkadavu Kureepuzha

4.3.2 TOPOGRAPHICAL SURVEY USING DGPS

For ascertaining accurate reduced levels of all control points in the primary model, Real Time Kinematic Survey (RTK) using DGPS was performed. The DGPS data was retrieved in a computer system and subsequently used for hydraulic simulation of the network.

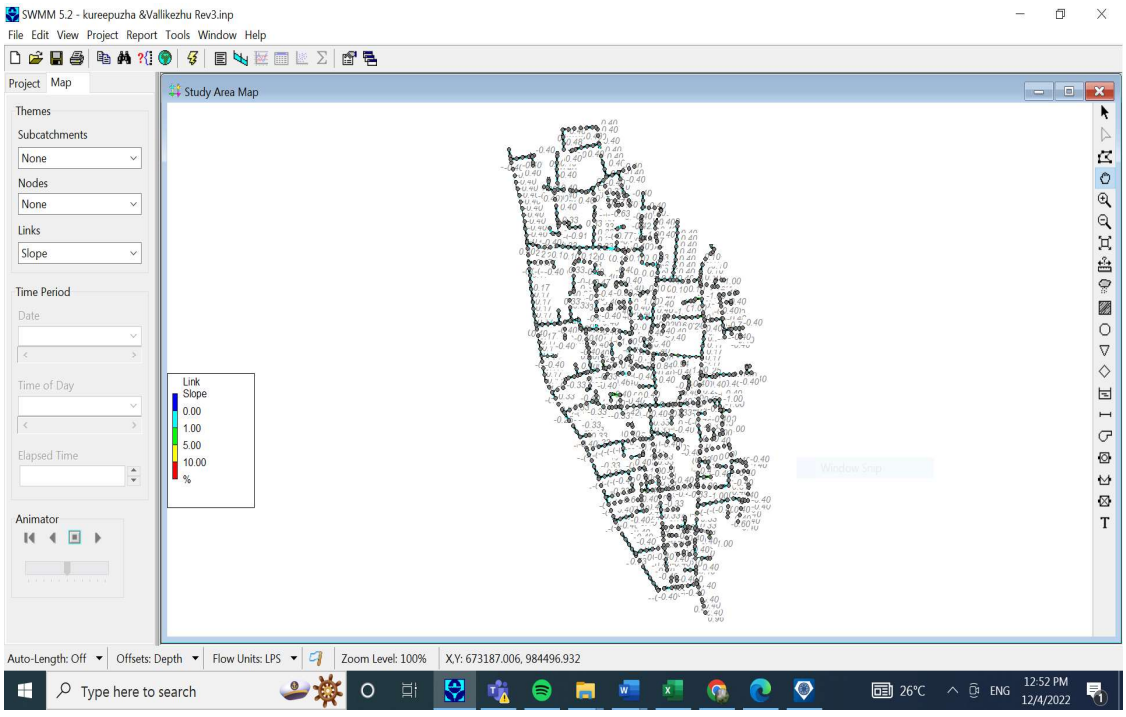
Social aspects of the sewage load generation have been examined in detail by performing social survey for the project area. It included gathering information regarding presence of houses, commercial establishments and other public institutions. The variations of sewage flow and expected abnormalities were also studied and incorporated in the sewer network design

4.3.3 HYDRAULIC SIMULATION OF SEWAGE NETWORK

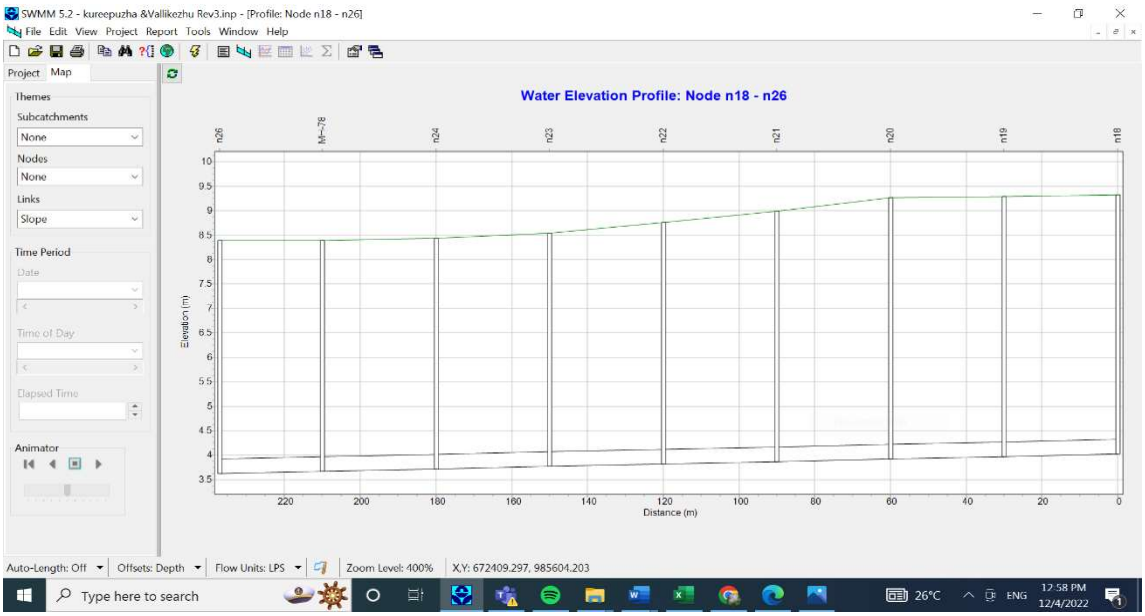
Hydraulic simulation of sewage network was performed after collection of all basic input data like sewage inflow at all points, expected routing plan for easy carriage of sewer load to Divisions a the collection well and location of STP. A suitable peak factor to accommodate sewage flow variations are provided in the hydraulic analysis depending on the population. The sewer flow is expected to be carried out in gravity conditions through a network of pipelines, manholes and lifting stations. The maximum depth of cutting is 7.75m. For all pipelines, minimum slopes to generate gravity flow are given as per the recommendations of CPHEEO Manual of Sewage Treatment Systems.

For hydraulic simulation of the sewage network comprising of pipelines, manholes and lifting stations, US Environmental Protection Agencies' Storm Water Management Model (SWMM) is adopted considering its versatility in hydraulic modeling using dynamic flow routing conditions.

For calculation of inflow into each manhole, the data generated from detailed social survey is depended upon.



Computer simulation using EPASWMM5.2



Profile plot with computer simulation

4.4 DESIGN OF MANHOLES

A manhole is an opening by which a man may enter a sewer for inspection, cleaning and other maintenance and fitted with a removable cover to withstand traffic loads in sewers. Having designed the sewer system, the manholes are first constructed in identified reaches before the sewers are laid. The diameters of circular manholes for stated depths of sewers are in Table as shown below:

Sl. No	**Range of depths, in m**	Internal diameter in
1	Above 0.90 m and up to 1.65 m	0.90
2	Above 1.65 m and up to 2.30 m	1.20
3	Above 2.30 m and up to 5.90 m	1.5

Details of manholes in network

Manholes are primarily designed as reinforced cement concrete elements with special treatment to resist corrosive and adverse environments. Manholes should be built to cause minimum head loss and interference with the hydraulics of the sewer line. One way to maintain a relatively smooth flow transition through the manhole, when a small sewer joins one of a larger diameter, is to match the pipe crown elevations at the manhole. Precast rings for shaft can be done to manage inlet and out portions and house sewer connections through chambers. The structural design of the manholes is performed to withstand traffic loads also with controlled cracking under severe exposure conditions

Sl No	Type of Manhole	Internal diameter	External diameter	Average Depth	Average Volume(m3)
1	Class1	0.9	1.4	1.11	1.00
2	Class2	1.2	1.8	1.92	2.72
3	Class3	1.5	2.2	3.97	8.0

Classification of manholes

4.5 DESIGN OF COLLECTION WELL

A single collection wells at Mammoottilkadavu near the existing STP is proposed as per the existing conditions for the project area. This well is to be constructed in the land owned by Kollam Corporation. Two submersible centrifugal pumps are provided to work in parallel during peak hours flow or whenever the situation demands for it. The detailed design of the collection wells is presented below:

DESIGN OFCOLLECTION WELL AT KUREEPUZHA			
Average inflow into well from network	23.45	LPS	
Peak inflow into well from network	70.35	LPS	PF
Average flow into well from other well	0	LPS	
Peak flow into well from other well	0	LPS	
Total average inflow into well from network+other well	23.45	LPS	
Total peak inflow into well from network+other well	70.35	LPS	
Peak hours	4		
Number of pumps operated in peak hours	2		
Rated outflow during peak hours/pump in parallel	23.45	LPS	
Total rated outflow in peak hours	46.90	LPS	
Inflow converted into storage during peak hours	23.45	LPS	
Volume of sewage to be stored in well	337.68	m^3	
Diameter of collection well-inner	9	m	**Depth from GL**
Depth of collection well for storage	5.5	m	
Volume of sewage actually stored in well	349.90	m^3	ok
Wall thickness of collection well	0.25	m	
Base slab thickness	0.25	m	
Offset to base slab	0.25	m	
Outer dia of collection well	9.5	m	
Freeboard of collection well	0.25	m	
Distance of travel in pumping to next station	75	m	
Velocity of travel adopted	1	m/sec	
Diameter of pumping line required	172.79	mm	fix OD
		pressure rating	
Total head for the pump set	15	m	
Discharge for the pump set 1*DWF	23.45	LPS	efficiency
Power required for pump set/number	9.98	HP	fix HP

Design of collection well and pumping line

ASSISTANT EXECUTIVE ENGINEER II
PPD & Sewerage Circle
Kerala Water Authority
Jalabhavan, Vellayambalam
Thiruvananthapuram-33

Executive Engineer,
PPD & Sewerage Circle,
Jalabhavan,
Kerala Water Authority,
Thiruvananthapuram

Superintending Engineer,
PPD & Sewerage Circle,
Jalabhavan,
Kerala Water Authority,
Thiruvananthapuram

Assistant Engineer
PPD Camp Office
Kerala Water Authority
Thiruvananthapuram

4.6 LAYING OF SEWER NETWORK

In the following sections, important matters in connection with the laying of sewer network and making the system efficient is illustrated in detail

4.6.1 EXCAVATION AND LAYING

1. On all excavation work, safety precautions for the protection of life and property are essential; and measures to avoid too great inconveniences to the public are desirable. Such measures and precautions include the erection and maintenance of signs (to forewarn public), barricades, bridges, and detours; placing and maintenance of lights both for illumination and as danger signals; provision of watchmen to exclude unauthorized persons, particularly children from trespassing on the work.
2. Computation of the safe load carrying capacity of the pipe when installed and bedded in the manner to be specified using a suitable factor of safety and making certain the design supporting strength thus obtained is greater than the maximum load to be applied.
3. Sewers may be laid in trenches or under embankment in areas which may be temporarily or permanently submerged in water. The fill load in such cases will be reduced and will correspond to the buoyant weight of the fill material. However, effect of submergence could be ignored which provides an additional factor of safety, but it may be necessary to check whether a pipe is subject to flotation. Under submergence, the minimum height of the fill material that will be required to prevent flotation ignoring the frictional forces in the fill can be determined. Wherever sufficient height of fill material is not available, anti-flotation blocks should be provided.
4. All rigid pipes may be tested for strength in the laboratory by the three-edge bearing test (ultimate load).
5. Width of the trench specified for a particular job should be minimum in consonance with the requirements of adequate working space to allow access to all parts and joints of pipe.
6. The Field Engineer should keep in touch with the Design Engineer throughout the duration of the Project and any deviation from the design assumptions due to the exigencies of work, should be immediately investigated and corrective measures taken in time.
7. All pipes used on the work should be tested as per the IS specifications and test certificates of the manufacturers should be furnished for every consignment brought to the site.
8. Whenever shoring is used, the pulling out of planks on completion of work should be carried out in stages and this should be properly supervised to ensure that the space occupied by the

planks is properly backfilled.

9. Proper backfilling methods both as regards to selection of materials, methods of placing and proper compaction should be in general agreement with the design assumptions.

10. In quicksand conditions, it is necessary to anchor the sewer to the ground and hold it at the grade as laid in the face of soil sinkage.

11. The type of bedding (granular, concrete cradle, full concrete encasement etc.) would depend on the soil strata and depth at which sewer is laid.

12. It is understood that the line (horizontal alignment) and grade layout of a sewer line as per design must be carried out meticulously. The horizontal layout determines the location as well as direction of the sewer line, while slope (grade) of the line provides the necessary hydraulic carrying capacity of the sewerage system.

13. The location of the trench is generally laid out first as an offset line running parallel to the proposed sewer centre line. This offset line is demarcated by wooden stakes driven into the ground surface at intervals of, say, 15 m. The offset line, as is clear, is quite away from the sewer centre line with a view not to allow it being disturbed during construction; however, it must be proximate enough so that the transfer of measurements to the actual trench can readily be done.

14. Two procedures are available to lay pipe sections in the open trench, namely, by batter boards, and by laser beams. Better boards are placed across the trench at uniform intervals. The tops of these boards can be set at some even height above the designed sewer invert elevation. The centre line of the sewer is traced on the boards by extending a line of sight with a transit level or a theodolite and a string is stretched from board to board along this very line. Later on this Line is transferred onto the trench bed by means of a plumb bob. Invert levels and action line is transferred onto the trench bed by means of a plumb bob. Invert levels and characteristics indicated by vertical rods are marked off in even increments -the lower end of each rod is placed on the pipe invert, and the string over the batter boards helps to check if it matches with the proper elevation mark on the rod, by appropriate adjustment of the pipe placement centre line transferred. In the laser method, advantage is taken of an intense, narrow beam of light that is projected by the laser instrument, over a long distance. This beam is aligned through a sewer pipe to strike a target held at the other end of the pipe. A transit that is placed above a manhole helps establish the alignment of the sewer with reference to field survey points and transfer it

down to the laser instrument that is mounted inside the manhole. Lasers can achieve an accuracy of 0.01 per cent over up to 300 m15. Cross drainage works arise when a sewer must

cross another service like electricity, water line, gas piping, telecommunication cable, river courses, nalas, etc.

16. Regarding power cables, the sewer shall be above and apart from the power cable by at least 30 cm as per IS: 1255. Regarding water lines, the sewer shall always travel below the water line. Regarding gas lines, the sewer must travel above the gas line so that sewer gases if they escape need not accidentally set off an ignition of the gas line. Regarding telecommunication cables, lateral separation of at least 30 cm shall be followed. In cases of river crossings and nala crossings each situation shall be decided on its site conditions and gravity sewers may be converted to pumped sewer lines by a low lift dedicated pumping station before the crossing discharging into the gravity section after crossing the water course and this will help in always keeping the pumped sewer visible or close to the ground.

17. A cross connection between water main and sewer main seldom occurs because of the sizes of these mains. However, where the location is complicated, the water mains shall be either blue coloured pipes or painted with blue florescent coloured paint.

18. A minimum offset of equal to half the width of the manhole plus 30 cm shall be the lateral offset between water mains and sewer lines. It is advisable to encase the sewer than the water main.

19. Gravity sewers shall not be laid closer to water retaining structures and the effort should be to detour as far as possible. In case of leakages in sewer joints, the leakage may gain access to the sidewalls of the water retaining structures.

20. The width of trench at and below the top of a sewer should be the minimum necessary for its proper installation with the due consideration to its bedding. The width of a sewer trench depends on the type of shoring (single stage or two stage), working space required in the lower part of the trench and the type of ground below the surface.

21. Excavation for sewer trenches for laying sewers shall be in straight lines and to the correct depths and gradients required for the pipes as specified in the drawings. The material excavated from the trench shall not be deposited very close to the trench to prevent the weight of the materials from causing the sides of the trench to slip or fail. The sides of the trench shall, however, be supported by shoring where necessary to ensure proper and speedy excavation. In case, the width of the road or lane where the work of excavation is to be carried out is so narrow as to warrant the stacking of materials near the trench, the same shall be taken away to a place to be decided by the Engineer-in-Charge. This excavated material shall be brought back to the site of work for filling the trench.64

22. In case the presence of water is likely to create unstable soil conditions, a well point system

Shall be employed to drain the immediate area of the sewer trench prior to excavation operation. A well point system consists of a series of perforated pipes driven or jetted into the water bearing strata on either side of a sewer trench and connected with a header pipe leading to a pump, In the event of excavation being made deeper than necessary, the same shall be filled and stabilized.

23. The shoring shall be adequate to prevent caving in of the trench walls of subsidence of areas adjacent to the trench. In narrow trenches of limited depth, a simple form of shoring shall consist of a pair of 40 to 50 mm thick, and 30 cm wide planks set vertically at intervals and firmly strutted. For wider and deeper trenches, a system of wall plates (Wales) and struts of heavy timber section is commonly used. Continuous sheeting shall be provided outside the wall plates to maintain the stability of the trench walls. The number and the size of the wall plates shall be fixed considering the depth of trench and type of soil.

24. In non-cohesive soils combined with considerable ground water, it may be necessary to use continuous interlocking steel sheet piling to prevent excessive soil movements due to ground water percolation. Such sheet piling shall extend at least 1.5 m below the bottom of the trench unless the lower part of the trench is in fine material. In case of deep trenches, if conditions demand, excavation and shoring may be done in stages.

4.6.2 SEWER CARRIAGE SYSTEM WITH PIPELINES AND CONNECTIONS TO HOUSES/OTHER UNITS

1. Unlike in the case of CI, DI, UPVC pipe sewers, the HDPE sewers are normally butt welded and pre-assembled on ground and then only laid inside the trench spanning manhole to manhole. The butt welding shall follow the manufacturer's recommendations. Where flanged joints are needed for attaching or inserting fittings and specials like valves, the free end of the HDPE pipe shall be butt welded with a standard flange and thereafter the flanged jointing can be made. However, in the case of such pipes, the uplift during high groundwater conditions above the pipe level is a problem specifically in high ground water and coastal areas.
2. Other than the metallic and concrete pipe sewers, the uplift during high groundwater conditions above the pipe level is a problem specifically in high ground water locations, waterlogged locations, and coastal areas. The concrete surrounds or venteak piles shall be used to hold these in place in such conditions, where ground water can rise above the sewer.
3. Each section of sewer shall be tested for water tightness preferably between manholes. To prevent change in alignment and disturbance after the pipes have been laid, it is desirable to backfill the pipes up to the top keeping at least 90 cm length of the pipe open at the joints. However, this may not be feasible

in the case of pipes of shorter length, such as stoneware and RCC pipes. With concrete encasement or concrete grade, partial covering of the pipe is not necessary

4. As soon as a stretch of sewer is laid and tested, a double disc or solid or closed cylinder, 75 mm less in dimension than the internal dimension of the sewer shall be run through the stretch of the sewer to ensure that it is free from any obstruction.
5. Backfilling of the sewer trench is a very important consideration in sewer construction. The method of backfilling to be used varies with the width of the trench, the character of the material excavated, the method of excavation and the degree of compaction required
6. No trench shall be filled in unless the sewer stretches have been tested and approved for water tightness of joints. However, partial filling may be done keeping the joints open to avoid disturbance.
7. In the design of sewer systems, consideration should be given to the desirability of maintaining velocities sufficient to avoid sulphide build up and of minimizing pressure lines and points of high turbulence. The designer should take into consideration topography, grades of sewers, ventilation, materials of construction, sewage temperature and strength, etc
8. Any protective coating used should possess the following qualities: (i) it should be resistant to acid attack, (ii) it should bond securely to the concrete, (iii) it should be economical and durable, (iv) it should be resistant to abrasive action by flow of sewage, and (v) when applied, it should be thin enough to fill all pores and irregularities in the surface. The coating should be continuous with no pin holes or other breaks.
9. The house service sewer connections shall be performed only in manholes. In case of old sewers, a new manhole shall be inserted for this purpose. The material of the House Service Sewer shall be either UPVC or HDPE rigid straight pipes of 6 kg/cm2 pressure class in manufacture and as per IS: 15328 and IS: 4984 respectively
10. The minimum earth cover above the crown shall be 90 cm and where this becomes impossible; the property owner shall be directed to depress his terminal chamber to comply with the above especially as the public sewer manhole shall start at its crown at 90 cm below ground level. Where such sewers cross the electricity power cables, the specifications of IS: 1255 of 1983 reaffirmed in 2001 in clauses 6.3.3 and 6.3.3.1 shall be followed without any exception that all such house service sewers shall be only above the power cable and the minimum clearance 66 shall be 30 cm over the cable which itself shall be covered all around by 15 cm riddled soil and further protected on top by tiles, bricks or slabs.

11. The house owner shall be mandated to possess a “kraite” a type of non-corroding sufficiently flexible but rigid type of less than 10 mm diameter rod, which he/she shall use to rod the house service sewer freely up to the manhole and the labour of the local body shall not be deployed for any removal of obstructions in the house service sewer. Typically, it is possible to effect six service connections to a manhole
12. It is also recommended to install collection chambers outside a group of houses and collect sewer load

through pipes and connect chamber with manholes using pipes.

13. Sewer network system can be made efficient in operation using huge volume data obtained from individual sensors installed in the manholes and lifting points. This historical data will provide backbone for emergency routing plans for failure of a link or obstructions.
14. Sewer network system must be carefully examined using digital data for potential nodes of weakness or redundancies and specially addressed periodically.
15. There must be continuous coordination between the designer of the sewer network and the engineer in charge of the operation and maintenance of sewer system for addressing issues during repair, expansion of network and diagnostics of blocks.
16. A computer simulation model of the sewer network system must be constantly upgraded with data obtained from sensors for real time monitoring and future predictions of the versatility of the sewer carriage system. Similarly, all lifting manholes must also be continuously monitored in digital platform for performance appraisal and future modifications

DETAILED ESTIMATE

DETAILED ESTIMATE

Others-Sewerage Network design- Kureeppuzha west and Vallikkeezhu wards to be connected to 12 MLD STP at Kureeppuzha-Construction of Sewerage collection Well and Pump house at near STP at Kureeppuzha and allied works-Sewerage Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	CONSTRUCTION OF WELL						
1.001	2.31						
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared						
	Clearing Jungle						
	For all well site STP premises	500					500.000
	Total						**500.000**
						Total Quantity in sqm	**500.000**
1.002	2.33.1						
	Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth						
	Felling Trees						
	For well sites	5					5.000
	Total						**5.000**
						Total Quantity in each	**5.000**
1.003	50.2.33.7						
	Cutting branches of trees overhanging above any structures of girth between 90cm to 120cm including stacking of serviceable materials and disposal of unserviceable material, cost of labour, hire charges of rope and pully etc without making any damages to nearby structures etc complete.						
	Cutting branches						
	For well site	5					5.000
	Total						**5.000**
						Total Quantity in each	**5.000**
1.004	2.1.1						
	Earth work in surface excavation not exceeding 30 cm in depth but exceeding 1.5m in width as well as 10 sqm on plan including disposal of excavated earth up to 50 m and lift up to 1.5 m, disposed soil to be levelled and neatly dressed:All Kinds of soil						
	Earth work						
	well site	1	20.000	20.000			400.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**400.000**
						Total Quantity in sqm	**400.000**
1.005	100.3.9.1						
	Earthwork in open well excavation (above water) for wells of diameter above 9.0m and up to 12.0m in all kinds of soil and conveying and depositing the spoil within initial lead of 50m and lift up to 1.5m including neat banking.						
	Inner dia of Well -9 m						
	Earth work	1	3.14/4	12*12	1.500		169.560
	Total						**169.560**
						Total Quantity in cum	**169.560**
1.006	100.3.9.2						
	Earthwork in open well excavation (above water) for wells of diameter above 9.0m and up to 12.0m in all kinds of soil and conveying and depositing the spoil within initial lead of 50m and lift from 1.50m to 3.00m including neat banking.						
	Inside dia of well-9.0 m						
	Earth work	1	3.14/4	12*12	1.500		169.560
	Total						**169.560**
						Total Quantity in cum	**169.560**
1.007	OD156595/2022-2023						
	Sinking wells above up to 9.00 m dia. and up to 12.00 m inside and depth up to 3.00 m below spring level in all kind of soil to lines and levels and plumb by scooping out earth from inside and below the staining using necessary appliances including hire and labor for the same including dumping the spoil beyond the initial lead of 50 m etc. complete.(for depth 3.00 m-6.00 m)						
	Inside dia of well-9.0 m						
	Sinking wells	1	3.000				3.000
	Total						**3.000**
						Total Quantity in per metre	**3.000**
1.008	OD156631/2022-2023						
	:Sinking wells above up to 9.00 m dia. and up to 12.00 m inside and depth up to 3.00 m below spring level in all kind of soil to lines and levels and plumb by scooping out earth from inside and below the staining using necessary appliances including hire and labor for the same including dumping the spoil beyond the initial lead of 50 m etc. complete.(for depth 6.00 m-9.00 m)						
	Inside dia of well-9.0 m						
	Sinking wells	1	2.150				2.150
	Total						**2.150**
						Total Quantity in per metre	**2.150**
1.009	OD157007/2022-2023						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	:Sinking wells above up to 9.00 m dia. and up to 12.00 m inside and depth up to 3.00 m below spring level in ordinary rock to lines and levels and plumb by scooping out earth from inside and below the staining using necessary appliances including hire and labor for the same including dumping the spoil beyond the initial lead of 50 m etc. complete.(for depth 6.00 m-9.00 m)						
	ordinary rock						
	Sinking wells	1	0.500				0.500
	Total						**0.500**
						Total Quantity in per metre	**0.500**
1.010	OD152574/2022-2023						
	:Fabricating MS Kerb of size using 8 mm thick MS plate including cost ms plate and 10mm dia anger bar welded to the kerb and conveyance charges of MS plate,all fabrication charges, charges of painting outer side of the steel work with two or more coat deluxe multi surface paint to give an even shade over an under coat of primer erection tying anger bar with reinforcement placing in position etc complete:						
	MS Kerb						
	Well site	1	3.14*(9+0.5)				29.830
	Total						**29.830**
						Total Quantity in metre	**29.830**
1.011	2.17.1						
	Close timbering in case of shafts, wells, cesspits, manholes and the like including strutting, shoring and packing cavities (wherever required) etc. complete (Measurements to be taken of the face area timbered).Depth not exceeding 1.5 m						
	Close timbering						
	up to 1.5	1	3.14*12	1.500			56.520
	Total						**56.520**
						Total Quantity in sqm	**56.520**
1.012	100.6.1						
	Providing steel sheet shoring to the sides of the trenches to depths of above 4.00 m but not exceeding 6.00m using 6 mm M.S. sheet 0.50 M wide stiffen on edges with 50 mm x 50mm x 6 mm M.S. angles driving down vertically on either side one after another in lines and levels with suitable pile driving equipments and accessories to a maximum depth of 0.50 M below the bottom of the proposed excavation 0.5 M above ground level suitably braced by horizontal walling pieces at 75 x 150 mm x 8 mm angles on either side at intervals not exceeding 1.50M and horizontal screw jack type struts at 1.50M intervals and maintaining the shoring till the pipes are laid and works are completed, dismantling, cleaning and restacking for reuse including all labour, hire charges and conveyance for equipments, tools and plants and sundries etc. complete.						
	Steel shoring						

DRAFT
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		1	3.14*12	2.000			75.360
	Total						**75.360**
						Total Quantity in sqm	**75.360**
1.013	OD156724/2022-2023						
	Dry rubble masonry with hard stone in foundation and plinth including levelling up to plinth level						
	DR Packing						
	Bottom of plucking	1	3.14/4	10.5*10.5	0.300		25.964
	Total						**25.964**
						Total Quantity in cum	**25.964**
1.014	4.1.5						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	PCC						
		1	3.140/4	10.5*10.5	0.300		25.964
	Total						**25.964**
						Total Quantity in cum	**25.964**
1.015	OD152575/2022-2023						
	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge.“(Note :- Cement content considered in this item is @ 340 kg/cum.“Excess/ less cement used as per design mix is payable/recoverable separately).						
	For Kerb and side wall of the well of Dia 9 m inside						
	for kerb and mat	1	3.14/4	10*10	0.800		62.800
	steining up to ground	1	3.14*9.5	0.500	7.350		109.625
	for steining above ground level	1	3.14*9.5	0.500	0.750		11.186
	Top slab of well	1	3.14/4	10*10	0.300		23.550
	Walk way	1	3.140*11	1.000	0.150		5.181
	Column of Size 300 x 300 mm	6	0.300	0.300	5.000		2.700

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Sun shade	1	3.140*10.5	1.000	0.120		3.956
	Inverted beam/Roof over beam	2	7.500	0.300	0.600		2.700
	Inverted beam/Roof over beam	1	10.000	0.300	0.600		1.800
	Roof Slab	1	3.14/4	10.2*10.2	0.200		16.334
	Ring beam on Roof slab	1	(3.14*9.5)	0.300	0.450		4.027
	Ring Beam for Gantry Ring beam lifting of pump - Size 300 x 450 mm	1	(3.14*8.7)	0.300	0.450		3.688
	Total						**247.547**
						Total Quantity in cum	**247.547**
1.016	4.15						
	Extra for laying concrete in or under water and or liquid mud including cost of pumping or bailing out water and removing slush etc. complete. Note for item No. 4.15 : - The quantity will be calculated by multiplying the depth measured from the sub-soil water level upto centre of gravity of concrete under sub-soil water level with quantity of concrete in cum executed under the sub-soil water. The depth of centre of gravity shall be reconed correct to 0.10 m 0.05 m or more shall be taken as 0.10 m and less than 0.05 m ignored.						
	Extra for laying conctrete						
	Vide qty of item-13+14	257.964					257.964
	Total						**257.964**
						Total Quantity in cum	**257.964**
1.017	5.22.4						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelHot rolled deformed bars						
	Steel reinforcement						
	Vide Qty of item No-14 @ 100kg/m3	257.457				100.0000	25745.700
	Total						**25745.700**
						Total Quantity in kilogram	**25745.700**
1.018	5.3						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).						
	R.C.C works						
	beam across the well for providing guide pipe of bottom across the well for providing guide pipe of pump set and chainpump set and chain- 3 wells	1	10.500	0.300	0.400		1.260
	Slab for working plat form over the well and beam-3 wells	1	3.140/4	10.6*10.6	0.150	0.500000	6.615
	walk way over outer side of well	1	3.14*10.8	0.800	0.150	0.500000	2.035
	Total						**9.910**
						Total Quantity in cum	**9.910**
1.019	OD152582/2022-2023						
	Centering and shuttering including strutting propping etc and removal of form etc. Well Steining for circular works						
	Form work						
	outer of kerb	1	3.14*10		0.800		25.120
	inner of kerb	1	3.14*9.5		0.975		29.084
	steining up to ground level outer	1	3.14*10		7.350		230.790
	steining up to ground level inner	1	3.14*9		7.350		207.711
	steining above ground level outer	1	3.14*10		0.750		23.550
	steining up to ground level inner	1	3.14*9		0.750		21.195
	Total						**537.450**
	Form work						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	steining above ground level outer- 3 wells	3	3.17*5.45		0.800		41.464
	steining above ground level outer- 1 wells	1	3.17*7.45		0.800		18.893
	steining above ground level inner- 3 wells	3	3.17*5		0.800		38.040
	steining above ground level inner- 1 wells	1	3.17*7		0.800		17.752
	Total						**116.149**
						Total Quantity in sqm	**653.599**
1.020	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	Form work						
	Inverted beam/Roof over beam	2	2.000	7.300	2*0.600		35.040
	Inverted beam/Roof over beam	1	2.000	10.000	2*0.600		24.000
	Ring beam on Roof slab	1	3.140	9.500	2*0.45		26.847
	Ring Beam for Gantry Ring beam lifting of pump - Size 300 x 450 mm	2	3.140	8.700	2*0.45		49.172
	Total						**135.059**
						Total Quantity in sqm	**135.059**
1.021	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Form work						
	Top slab of well	1	3.14/4	10*10			78.500
	walk way over outer side of well-1 nos	1	3.14/4	11*11			94.985
	Roof Slab	1	3.14/4	10.2*10.2			81.671
	Total						**255.156**
						Total Quantity in sqm	**255.156**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.022	19.16						
	Providing orange colour safety foot rest of minimum 6 mm thick plastic encapsulated as per IS: 10910 on 12 mm dia steeel bar conforming to IS:1786, having minimum cross section as 23 mm x 25 mm and over all minimum length 263 mm and width as 165 mm with minimum 112 mm space between protruded legs having 2 mm tread on top surface by ribbing or chequering besides necessary and adequate anchoring projections on tail length on 138 mm as per standard drawing and suitable to with stand the bend test and chemical resistance test as per specifications and having manufactures permanent identification mark to be visible even after fixing including fixing in manholes with 30x20x15 cm cement concrete block 1:3:6 (1cement: 3 coarse sand: 6 graded stone aggregate 20 mm nominal size) Complete as per design						
	Foot rest for entering the well						
	well	40					40.000
	Total						**40.000**
						Total Quantity in each	**40.000**
1.023	14.72						
	Providing and fixing double scaffolding system (cup lock type) on the exterior side, upto seven story hight made with 40 mm dia. M.S. tube 1.5 m centre to centre, horizontal & vertical tubes joining with cup & lock system with M.S. tubes, M.S. tube challies, M.S. clamps and M.S. staricase system in the scaffolding for working platform etc. and maintaining it in a serviceable condition for the required duration as approved and removing it there after. The scaffolding system shall be stiffened with bracings, runners, connection with the building etc wherever required for inspection of work at required location with essential safety features for the workmen etc. complete as per directions and approval of Engineer- in Charge. The elevational area of the scaffolding shall be measured for payment purpose. The payment will be made once irrespective of duration of scaffolding. Note:- This item to be used for maintenance work judicially, necessary deduction for scaffolding in the existing item to be done .						
	Scaffolding work						
	Different works inside the wells	1	3.140	10.000	10.000		314.000
	Total						**314.000**
						Total Quantity in sqm	**314.000**
1.024	13.7.1						
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)						
	Plastering						
	Bottom of well	1	3.14/4	9*9			63.585
	Inside steining	1	3.14*9		8.650		244.449
	Working Platform under side	1	3.14/4	9*9			63.585
	working platform top	1	3.14/4	11*11			94.985
	Column	24	0.300		5.000		36.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Inverted beam/Roof over beam	1	10.000	0.3+0.3+ 0.6+0.6			18.000
	Inverted beam/Roof over beam	2	7.500	0.3+0.3+ 0.6+0.6			27.000
	Ring Beam for Gantry Ring beam lifting of pump - Size 300 x 450 mm	1	3.14*8.7	0.3+0.3+ 0.45+0.4 5			40.977
	Face of beam	3	5.000		.4+.25		9.750
	Face of beam	1	10.000		.4+.25		6.500
	Out side of well	1	3.14*10.6		0.800		26.627
	Miscellanious	1				100.00 0000	100.000
	Total						**731.458**
						Total Quantity in sqm	**731.458**
1.025	100.98.1016						
	Engaging Mason (for ornamental stone work) Ist class.						
	Engaging Mason						
	At 4 well sites	100					100.000
	Total						**100.000**
						Total Quantity in no	**100.000**
1.026	13.52.2						
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On concrete work						
	Inner portion of wells						
	Column	24	0.300	5.000			36.000
		1				100.00 0000	100.000
	Total						**136.000**
						Total Quantity in sqm	**136.000**
1.027	2.25						
	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m.						
	Filling available excavated earth						
	construction of Kerb	1	12.000	12.000	2.500		360.000
	outer side of well	-1	3.14/4	11*11	2.500		-237.462

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**122.538**
						Total Quantity in cum	**122.538**
1.028	OD152583/2022-2023						
	Carriage of Material(excavated earth) By Mechanical Transport including loading,unloading and stacking up tp 5 KM						
	Deduct quantity needed for filling						
	Qty vide item No-31	-122.538					-122.538
	Total						**-122.538**
	Excavated earth						
		1	3.140	5.500	5.500	8.650000	821.620
	Total						**821.620**
						Total Quantity in cum	**699.082**
1.029	100.7.1						
	Bailing out water with 5HP engine and pump set including conveyance to the site, erecting, dismantling and taking back of engine and pump, cost of fuel lubricating oil and other stores pay of staff etc., complete.						
	Bailing out water for construction of well						
		100	2.000	5.000	8.000	0.746000	5968.000
	Total						**5968.000**
						Total Quantity in Kwh	**5968.000**
1.030	100.7.2						
	Bailing out water with engine and pump set above 5HP up to 10HP including conveyance to the site, erecting, dismantling and taking back of engine and pump, cost of fuel lubricating oil and other stores pay of staff etc., complete.						
	Bailing out water for construction of well						
		100	1.000	10.000	8.000	0.746000	5968.000
	Total						**5968.000**
						Total Quantity in Kwh	**5968.000**
1.031	100.98.1008						
	Engaging Coolie.						
	Coolie engaged for bailing out water						
		100					100.000
	Total						**100.000**
						Total Quantity in no	**100.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.032	10.26.3						
	Providing and fixing hand rail of approved size by welding etc. to steel ladder railing, balcony railing, staircase railing and similar works, including applying priming coat of approves steel primer.G.I. pipes						
	handrail 1 m height and 2 horizontal						
		1	600.000				600.000
	Total						**600.000**
						Total Quantity in kg	**600.000**
1.033	18.68.2						
	Providing and laying D.I specials of class K - 12 suitable for push - on jointing as per IS : 9523 :Above 600 mm dia						
	DI K-12 Specials						
	600 mm Wall casting	2	0.730				1.460
	200 mm Wall casting	2	0.230				0.460
	Total						**1.920**
						Total Quantity in quintal	**1.920**
1.034	18.69.2						
	Providing and laying D.I Specials of Class K - 12 suitable for mechanical jointing as per IS : 9523 :Above 600 mm dia						
	MJ Collar						
	Convenient size MJ Collar	2	0.560				1.120
	Total						**1.120**
						Total Quantity in quintal	**1.120**
1.035	OD152584/2022-2023						
	Fabricating MS Base plate using 12 mm thick MS plate including cost and conveyance charges of MS plate,all fabrication charges, charges of painting the steel work with two or more coat deluxe multi surface paint to give an even shade over an under coat of primer etc complete.						
	MS plate fabrication for wells						
		2				2.000000	4.000
	Total						**4.000**
						Total Quantity in no	**4.000**
1.036	OD152585/2022-2023						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Supplying fabricating fixing I section for column no: B Size ISMB 250X125X12mm, Length- 5.20m, Supporting section ISLB 100X50X10mm 1m long, welded with MS plate size 300x300x12mm and 150x150mmx2nos with necessary ss fasteners priming coat etc.						
	fixing over column size of I section ISMB 250x125x12mm , length - 5.20m,Wt37.3kg/m,supporting section ISLB 100x50x10mm 1m long,Welded with MS plate size 300x300x12mm and 150x150mmx2Nos						
	for fixing Girder	1					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.037	OD152586/2022-2023						
	Supplying fabricating fixing I section for column no:A with ISMB250X125X12mm of 4.00m long welded with MS plate size 400X400X12mm 2nos and fixing to the RCC priming coating finishing etc as specified desighn.. 						
	I section fixing over steining						
		1					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.038	OD152587/2022-2023						
	Supplying fabricating fixing Girder over the column with ISMB 250X125X12mm and 10m long , MS Plate for end close 12mm size 250x250mm . Providing movable Chain pulley through the flange of the Girder and capable to carry 3tonne with 10m chain necessary flanges fastening with the column structure with weld and bolt nut end closer with 12mm plate prime coat etc complete						
	Fabricating Girder						
		1					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.039	OD157280/2022-2023						
	Supplying and fixing 3 T capacity gantry crane Manually operated having 2D movement at the Raw water pump house capable to lift the pumps and all accessories .The crane should be fixed so that the loading materials can be directly loaded to the vehicle						
	Supplying and fixing 3 T capacity gantry crane						
		1					1.000
	Total						**1.000**
						Total Quantity in 1 nos	**1.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.040	OD152588/2022-2023						
	Providing structural steel work for providing roof over the girder to prevent the corrosion with tubular sections 60x40x3.6mm,40x40x3.2mm, 50x25x3.2mm and 25x25x2.6mm welded each other and placed and welded over the I section necessary prime coat etc.. complete as specified design						
	providing structural steel work						
		1	15.000				15.000
	Total						**15.000**
						Total Quantity in metre	**15.000**
1.041	OD152589/2022-2023						
	Providing and fixing stainless steel (Grade 304) railing made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners , stainless steel bolts etc., of required size, on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge,(for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.).						
	Hand rail for wells						
	outer side wall of walk way	1	3.14*10.6		0.800	0.500000	13.314
	inner side of walk way-	1	3.14*10.2		0.800	0.500000	12.811
	over the beam	1	10.200		0.800		8.160
	outer edge of working platform	1	3.14*10.6		0.800	0.500000	13.314
	stair	2	1.500		0.800		2.400
	Total						**49.999**
						Total Quantity in sqm	**49.999**
1.042	13.46.1						
	Finishing walls with Acrylic Smooth exterior paint of required shade:New work (Two or more coat applied @ 1.67 ltr/10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/10 sqm)						
	Painting for wells						
	workimg platform,outside of well,beam,sides of step etc	1				75.000000	75.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**75.000**
						Total Quantity in sqm	**75.000**
1.043	13.62.1						
	Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade:Two or more coats on new work over an under coat of suitable shade with ordinary paint of approved brand and manufacture .						
	For steel work						
		1				75.000 000	75.000
	Total						**75.000**
						Total Quantity in sqm	**75.000**
2	Construction of Valve Chamber,Cable duct,Pump House and connected works						
2.001	2.8.1						
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil						
	Earth work in excavation by mechanical means (Hydraulic excavator)						
	for valve chamber near new well A	1	4.000	2.500	1.500		15.000
	for cable duct	2	4.500	0.700	0.800		5.040
	for cable duct	2	2.000	0.700	0.800		2.240
	for new bathroom	4	5.600	0.600	1.000		13.440
	DG shed long wall	4	1.000	3.600	0.600		8.640
	DG shed short wall	4	2.700	0.600	1.000		6.480
	Total						**50.840**
	Pump House						
	Column footings	8	1.500	1.500	1.500		27.000
	RR work	2	5.000	0.500	0.500		2.500
	RR work	3	3.000	0.500	0.500		2.250
	Total						**31.750**
						Total Quantity in cum	**82.590**
2.002	OD152590/2022-2023						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means in foundation trenches of manholes or drains (exceeding 1.5 m in width or 10 sqm on plan) including dressing of sides and ramming of bottom,including getting out the excavated soil and disposal of surplus excavated soil as directed, with in a lead of 50 m for depth exceeding 1.50m but not exceeding 3.00m						
	Earth work in excavation						
	for valve chamber for new well	1	4.000	2.500	0.800		8.000
	Pump House-column footing	8	1.500	1.500	0.600		10.800
	Total						**18.800**
						Total Quantity in cum	**18.800**
2.003	2.17.1						
	Close timbering in case of shafts, wells, cesspits, manholes and the like including strutting, shoring and packing cavities (wherever required) etc. complete (Measurements to be taken of the face area timbered).Depth not exceeding 1.5 m						
	Close timbering						
	for valve chamber for new well	2	4+2.5		1.500		19.500
	column	8	6.000		1.500		72.000
	Total						**91.500**
						Total Quantity in sqm	**91.500**
2.004	2.17.2						
	Close timbering in case of shafts, wells, cesspits, manholes and the like including strutting, shoring and packing cavities (wherever required) etc. complete (Measurements to be taken of the face area timbered).Depth exceeding 1.5 m but not exceeding 3 m						
	Close timbering						
	for valve chamber ner new well	2	4+2.5		0.800		10.400
	for valve chamber ner new well	8	6.000		0.600		28.800
	Total						**39.200**
						Total Quantity in sqm	**39.200**
2.005	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Pump house						
	footing	8	1.500	1.500	0.200		3.600
	for Ramp	1	2.000	1.500	0.100		0.300
	for Step	1	1.200	0.600	0.100		0.072
	Internal floor	1	6.000	4.000	0.100		2.400
	Internal floor	1	4.000	2.500	0.100		1.000
	Total						**7.372**
	PCC						
	For valve chamber	1	3.400	1.900	0.200		1.292
	For cable duct	2	4.500	0.700	0.100		0.630
	For cable duct	2	2.000	0.700	0.100		0.280
	Total						**2.202**
						Total Quantity in cum	**9.574**
2.006	5.1.2						
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size						
	RCC for Manholes						
	for valve chamber	1	10.600	0.150	1.800		2.862
	Top slab valve chamber	1	3.550	2.650	0.200		1.882
	for cable duct	2	5.500	.7+.7+.4	0.150		2.970
	for cable duct	2	2.000	.7+.7+.4	0.150		1.080
	valve chamber	1	3.200	1.700	0.150		0.816
	Plinth protection	2	10.700	0.750	0.150		2.408
		2	4.500	0.750	0.150		1.013
	for footing mat	8	1.250	1.250	(.4+.2)/2		3.750
	column upto ground level	6	0.400	0.230	1.600		0.883
		2	0.400	0.230	0.600		0.110
	others	1				2.500000	2.500
	Total						**20.274**
						Total Quantity in cum	**20.274**
2.007	5.2.2						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)						
	Pump house						
	column above plinth level	6	0.400	0.230	4.000		2.208
	column above plinth level	2	0.400	0.230	4.500		0.828
	Total						**3.036**
						Total Quantity in cum	**3.036**
2.008	5.3						
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).						
	Pump house						
	for lintel	2	9.200	0.230	0.150		0.635
		3	4.000	0.230	0.150		0.414
		1	2.500	0.100	0.150		0.038
	beam	1	4.500	0.230	0.450		0.466
	sun shade allround	1	26.000	0.600	0.075		1.170
		1	3.000	0.750	0.075		0.169
	for slab	1	9.500	4.700	0.100		4.465
	plinth beam	2	9.200	0.230	0.450		1.904
		4	4.000	0.230	0.450		1.656
		1	2.500	0.230	0.300		0.173
	Total						**11.090**
						Total Quantity in cum	**11.090**
2.009	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	Formwork for manholes						
	for valve chamber	2	3.2+1.7		0.100		0.980
	for valve chamber B	4	1.700		0.100		0.680

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	for new baTHROOM BELT CONCRETE	2	2.4+2.8		0.150		1.560
	for valve chamber A	2	3.4+1.9		0.200		2.120
	for valve chamber B	2	1.900		0.200		0.760
		1	3.6+3		0.150		0.990
	others	1	3.6+3		0.150	75.000 000	74.250
	Total						**81.340**
						Total Quantity in sqm	**81.340**
2.010	5.9.2						
	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.						
	Foot rest for Manholes and Cable duct						
	For cable duct	2	5.500	2*0.7			15.400
	For cable duct	2	2.000	2*0.7			5.600
	For valve chamber A outer	1	2*(3.3+1.8)		1.800		18.360
	For valve chamber A inner	1	2*(3+1.50)		1.800		16.200
	For valve chamber B outer	1	4*1.8		1.800		12.960
	For valve chamber B inner	1	4*1.5		1.800		10.800
	top slab valve chamber A	1	3.000	1.500			4.500
	top slab valve chamber B	1	1.500	1.500			2.250
	Total						**86.070**
						Total Quantity in sqm	**86.070**
2.011	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	for roof slab						
	sunshade	1	3.200	0.600			1.920
	roof slab	1	2.800	1.700			4.760
	others	1				60.000 000	60.000
	Total						**66.680**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in sqm	**66.680**
2.012	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	For lintel						
		4	9.200		0.150		5.520
		6	4.000		0.150		3.600
		2	2.500		0.150		0.750
		2	4.000		1.150		9.200
	Total						**19.070**
						Total Quantity in sqm	**19.070**
2.013	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	for column						
		6	1.260	3.650			27.594
		2	1.260	3.150			7.938
	Total						**35.532**
						Total Quantity in sqm	**35.532**
2.014	5.22.4						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelHot rolled deformed bars						
	Steel reinforcement						
	Qty vide item No- 6 +7+8	34.4				120.000000	4128.000
	Total						**4128.000**
						Total Quantity in kilogram	**4128.000**
2.015	9.1.1						
	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately).Second class teak wood						
	for pump house						
		1				0.500000	0.500
	Total						**0.500**
						Total Quantity in cum	**0.500**
2.016	9.5.1.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing panelled or panelled and glazed shutters for shutters for doors, windows and clerestory windows, including ISI marked M.S. pressed butt hinges bright finished of required size with necessery screws, excluding panelling which will be paid for separately, all complete as per direction of Engineer - in-charge. Second class teak wood35 mm thick shutters						
	Pump house						
	Door	2	0.900	2.100			3.780
	window	4	1.200	1.500			7.200
		2	0.600	1.500			1.800
	ventilator	1	0.600	0.450			0.270
	Total						**13.050**
						Total Quantity in sqm	**13.050**
2.017	19.16						
	Providing orange colour safety foot rest of minimum 6 mm thick plastic encapsulated as per IS: 10910 on 12 mm dia steeel bar conforming to IS:1786, having minimum cross section as 23 mm x 25 mm and over all minimum length 263 mm and width as 165 mm with minimum 112 mm space between protruded legs having 2 mm tread on top surface by ribbing or chequering besides necessary and adequate anchoring projections on tail length on 138 mm as per standard drawing and suitable to with stand the bend test and chemical resistance test as per specifications and having manufactures permanent identification mark to be visible even after fixing including fixing in manholes with 30x20x15 cm cement concrete block 1:3:6 (1cement: 3 coarse sand: 6 graded stone aggregate 20 mm nominal size) Complete as per design						
	Providing orange colour safety foot rest						
	valve chamber A	6					6.000
	valve chamber B	3					3.000
	Total						**9.000**
						Total Quantity in each	**9.000**
2.018	13.7.1						
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)						
	chamber and side wall of cable duct						
	for valve chamber A floor	1	3.000	1.500			4.500
	for cable duct	2	5.500	.7+.7+.4			19.800
	for cable duct	2	2.000	.7+.7+.4			7.200
	for valve chamber A	2	3+1.5		1.800		16.200
	Total						**47.700**
						Total Quantity in sqm	**47.700**
2.019	7.7.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Coursed rubble masonry (second sort) with hard stone in foundation & plinth with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	Coursed rubble masonry						
	foundation of bathroom	4	5.600	0.600	0.800		10.752
	long wall back	4	3.600	0.600	0.800		6.912
	long wall front	4	4.800	0.600	0.800		9.216
	short wall	4	2.700	0.600	0.800		5.184
	Total						**32.064**
						Total Quantity in cum	**32.064**
2.020	50.6.1.2						
	Solid block masonry using pre cast solid blocks (Factory made) of size 40x20x20cm or nearest available size confirming to IS 2185 part I of 1979 for super structure up to floor two level thickness 20cm and above in: CM 1:6 (1 cement: 6 coarse sand) etc complete.						
	Solid block masonry						
	wall of bath	4	5.400	0.200	3.500		15.120
	long wall	4	3.600	0.200	3.500		10.080
	short wall	4	2.800	0.200	(3.50+3)/2		7.280
	Total						**32.480**
						Total Quantity in cum	**32.480**
2.021	13.9.1						
	Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster						
	CC 1:3						
	celing	1	6.000	4.000			24.000
		1	4.000	1.125			4.500
	beam	1	2.500	2.400			6.000
	others	1				350.000000	350.000
	Total						**384.500**
						Total Quantity in sqm	**384.500**
2.022	13.9.2						
	Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.20 mm cement plaster						
	CC 1:3						
	Roof slab top	1	9.200	4.300			39.560
		2	9.300	0.300			5.580
		3	4.500	0.300			4.050

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Floor	1	6.000	4.000			24.000
		1	2.500	2.400			6.000
		1	20.000	0.150			3.000
		1	9.800	0.150			1.470
	Total						**83.660**
						Total Quantity in sqm	**83.660**
2.023	13.60.1						
	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade:Two or more coats on new work						
	Wall painting						
	same as qty vide item-21	384.5					384.500
	Total						**384.500**
						Total Quantity in sqm	**384.500**
2.024	4.2.3						
	Providing and laying cement concrete in retaining walls, return walls, walls (any thickness) including attached pilasters, columns, piers, abutments, pillars, posts, struts,buttresses, string or lacing courses, parapets, coping, bed blocks, anchor blocks, plain window sills, fillets, sunken floor, etc. up to floor five level, excluding the cost of centering, shuttering and finishing:1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)						
	Concrete for Floor						
	over boundary wall for fixing steel fencing	4	125.000	0.200	0.150		15.000
	for floor of bathroom	4	2.200	11.400	0.100		10.032
	for floor strengthen of prop.gen.roomof bathroom	4	4.000	3.000	0.150		7.200
	Total						**32.232**
						Total Quantity in cum	**32.232**
2.025	11.40						
	Providing and laying rectified Glazed Ceramic floor tiles of size 300x300 mm or more (thickness to be specified by the manufacturer) of Ist quality conforming to IS: 15622 of approved make in all colours, shades, except white, Ivory, Grey Fume Red Brown, laid on 20 mm thick cement mortar 1:4 (1 Cement : 4 Coarse sand) including pointing the joints with white cement and matching pigments etc., complete.						
	Pump house						
	floor	1	2.000	1.300			2.600
		1	5.800	2.100			12.180

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**14.780**
						Total Quantity in sqm	**14.780**
2.026	11.41.2						
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.						
	Laying vitrified Tiles						
	floor of power room	4	4.500	3.500			63.000
	operators room	4	4.500	3.000			54.000
	Total						**117.000**
						Total Quantity in sqm	**117.000**
2.027	17.1.1						
	Providing and fixing water closet squatting pan (Indian type W.C. pan) with 100 mm Sand Cast Iron P or S trap, 10 litter low level white P.V.C.flushing cistern, including flush pipe, manually controlled device (handle lever) conforming to IS : 7231, with all fittings and fixtures complete, including cutting and making good the walls and floors wherever require:White Vitreous china Orissa pattern W.C. pan of size 580x440 mm with integral type foot rests						
	fixing water closet						
		1					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
2.028	17.7.3						
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 550x400 mm with a pair of 15 mm C.P. brass pillar taps						
	fixing wash basin						
		1					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
2.029	50.18.8.2.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work,including cutting chased and making good the wall etc. 20 mm pipe 12 Kgf/cm2						
	fixing PVC pipes,						
		1	5.000				5.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**5.000**
						Total Quantity in metre	**5.000**
2.030	50.18.8.8.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 75 mm pipe 6 Kgf/cm2						
	fixing PVC pipes,						
		1	2.000				2.000
	Total						**2.000**
						Total Quantity in metre	**2.000**
2.031	50.18.8.9.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chased and making good the wall etc. 110 mm pipe 6kgf/cm2						
	fixing PVC pipes, f						
		1	2.000				2.000
	Total						**2.000**
						Total Quantity in metre	**2.000**
2.032	50.18.9.4.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge.32 mm dia 10.Kgf/cm2						
	fixing PVC pipes,						
		1	25.000				25.000
	Total						**25.000**
						Total Quantity in metre	**25.000**
2.033	50.18.9.5.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching refilling & testing of joints complete as per direction of Engineer in Charge 40 mm dia 10Kgf/cm2						
	fixing PVC pipes,						
		1	50.000				50.000
	Total						**50.000**
						Total Quantity in metre	**50.000**
2.034	50.18.9.8.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	fixing PVC pipes						
		1	5.000				5.000
	Total						**5.000**
						Total Quantity in metre	**5.000**
2.035	50.18.9.9.1						
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2						
	fixing PVC pipes						
		1	30.000				30.000
	Total						**30.000**
						Total Quantity in metre	**30.000**
2.036	50.18.9.13.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 25 mm dia 12 Kgf/ cm2- External work- exposed on wall						
	fixing PVC pipes						
		1	5.000				5.000
	Total						**5.000**
						Total Quantity in metre	**5.000**
2.037	50.18.9.14.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 10 Kgf/cm2 - External work- Exposed on wall						
	fixing PVC pipes						
		1	5.000				5.000
	Total						**5.000**
						Total Quantity in metre	**5.000**
2.038	50.18.9.15.1						
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 40 mm dia 10Kgf/cm2- External work- Exposed on wall						
	fixing PVC pipes						
		1	10.000				10.000
	Total						**10.000**
						Total Quantity in metre	**10.000**
2.039	50.18.9.17.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing PVC pipes including fixing the pipe with clamps/ clip at 1.00 m spacing . This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 63 mm dia 6 Kgf/cm2 - External work - Exposed on wall						
	fixing PVC pipes						
		1	3.000				3.000
	Total						**3.000**
						Total Quantity in metre	**3.000**
2.040	50.18.9.19.1						
	Providing and fixing PVC pipes including fixing the pipe with clamps/ clips/ at 1.00 m spacing . This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 mm dia 6 Kgf/cm2 - External work- Exposed on wall						
	fixing PVC pipes						
		1	5.000				5.000
	Total						**5.000**
						Total Quantity in metre	**5.000**
2.041	50.18.9.20.1						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 63 mm dia Elbow						
	fixing PVC moulded fittings						
		2					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
2.042	50.18.9.20.3						
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 63 mm dia Door Elbow						
	fixing PVC moulded fittings						
		1					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
2.043	50.18.9.22.6						
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 110x110x110 mm dia Door tee						
	fixing PVC moulded fittings						
		1					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
2.044	50.18.9.22.8						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement -110 mm dia Vent cowl						
	fixing PVC moulded fittings						
		1					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
2.045	50.18.9.22.9						
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -110 mm dia offset						
	fixing PVC moulded fittings						
		2					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
2.046	18.48						
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.						
	Storage Tank						
		1				2000.000000	2000.000
	Total						**2000.000**
						Total Quantity in Litre	**2000.000**
2.047	50.17.1.3						
	Supplying and fixing CP Towel rod 60cm or nearest available length including cost of materials and labour charges etc complete as per the direction of site Engineer-in-charge.						
	fixing CP Towel rod 60cm						
		1					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
2.048	50.17.1.4						
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.						
	Supplying and fixing CP Towel rod 60cm or nearest available length including cost of materials and labour charges etc						
		1					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
2.049	18.50.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing C.P brass long nose bib cock of approved quality conforming to IS standards and weighing not less than 810 gms.15 mm nominal bore						
	Providing and fixing C.P brass long nose bib cock of approved quality conforming to IS standards and weighing not less than 810						
		1					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
2.050	18.64						
	Providing and fixing PTMT swivelling shower, 15 mm nominal bore, weighing not less than 40 gms.						
	Providing and fixing PTMT swivelling shower, 15 mm nominal bore, weighing not less than 40 gms						
		1					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
2.051	18.17.1						
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :25 mm nominal bore						
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :						
		5					5.000
	Total						**5.000**
						Total Quantity in each	**5.000**
2.052	18.18.1						
	Providing and fixing ball valve (brass) of approved quality, High or low pressure, with plastic floats complete:15 mm nominal bore						
	Providing and fixing ball valve (brass) of approved quality, High or low pressure, with plastic floats complete:						
		1					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
2.053	18.21.2.1						
	Providing and fixing uplasticised PVC connection pipe with brass unions: 45 cm length15 mm nominal bore						
	Providing and fixing uplasticised PVC connection pipe with brass unions: 45 cm length						
		1					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
2.054	18.52.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and fixing C.P brass stop cock (concealed) of standard design and of approved make conforming to IS: 893115 mm nominal bore						
	Providing and fixing C.P brass stop cock (concealed) of standard design and of approved make conforming to IS: 8931						
		1					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
2.055	18.53.1						
	Providing and fixing C.P. brass angle valve for basin mixer and geyser points of approved quality conforming to IS: 893115 mm nominal bore						
	Providing and fixing C.P. brass angle valve for basin mixer and geyser points of approved quality conforming to IS: 8931						
		1					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
2.056	18.58.2.1						
	Providing and fixing PTMT grating of approved quality and colour. Rectangular type with openable circular lid150 mm nominal size square 100 mm diameter of the inner hinged round grating						
	Providing and fixing PTMT grating of approved quality and colour. Rectangular type with openable circular lid 150 mm nominal size square 100 mm diamete						
		1					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
2.057	14.54.1						
	Painting with synthetic enamel paint of approved brand and manufacture of required colour to an give even shade:One or more coats on old work						
	Pump house						
	Door	2	0.900	2.100		2.250000	8.505
	Widows	4	1.200	1.500		1.500000	10.800
	Widows	2	0.600	1.500		1.500000	2.700
	ventilator	1	0.600	0.450		1.500000	0.405
	Rolling shutter	1	1.800	2.500		2.250000	10.125
	Total						**32.535**
						Total Quantity in sqm	**32.535**
2.058	19.30.1.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Constructing brick masonry chamber for underground C.I. inpection chamber and bends with bricks in cement mortar 1:4 (1 cement: 4 coarse sand) C.I.cover with frame (light duty) 455x610 mm internal dimensions, total weight of cover with frame to be not less than 38 kg (weight of cover 23kg and weight of frame 15 kg), R.C.C top slab with 1:2:4 mix (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm nominal size) foundation concrete 1:5:10 (1 cement: 5 fine sand: 10 graded stone aggregate 40 mm nominal size), inside plastering 12 mm thick with cement mortar 1:3 (1 cement: 3 coarse sand) finished smooth with a floating coat of neat cement on walls and bed concrete etc. complete as per standard design: Inside dimensions 455x610 mm and 45 cm deep for single pipe line:With common burnt clay F.P.S. (non modular) bricks of class designation 7.5						
	Constructing brick masonry chamber for underground C.I. inpection chamber and bends with bricks in cement mortar 1:4 (1 cement: 4						
		3					3.000
	Total						**3.000**
						Total Quantity in each	**3.000**
2.059	13.47.1						
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)						
	Pump house						
	All round length	1	27.300		4.500		122.850
	Total						**122.850**
						Total Quantity in sqm	**122.850**
2.060	13.51.2						
	Painting with silicon & acrylic emulsion based water thinnable sealer of approved brand and manufacture on wet or patchy portion of plastered surfaces:Two coats						
	new structure						
	bathroom	8	3.550		3.500		99.400
	Total						**99.400**
						Total Quantity in sqm	**99.400**
2.061	13.62.1						
	Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade:Two or more coats on new work over an under coat of suitable shade with ordinary paint of approved brand and manufacture .						
	for the roof of DG shed						
	Hrizontal pole for truss holding section 80mm dia tube	4	5.500	0.280			6.160

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	vertical pole for truss holding section 80mm dia tube	16	3.150	0.280			14.112
	bottom and top of truss 60*40*3.6mm tube	8	3.650	0.181			5.285
	support of bottom cord and top of truss50*25*3.2mm tube	44	0.430	0.134			2.535
	purling 50*25*3.2mm tube	52	5.600	0.134			39.021
	Total						**67.113**
	new structure						
	gate	4	5.000		1.800		36.000
	fencing	4	130.000		0.500		260.000
	grating of cable duct	4	13.000		0.500		26.000
	name boaed	4	5.000	0.500			10.000
	Total						**332.000**
						Total Quantity in sqm	**399.113**
2.062	OD152591/2022-2023						
	Providing steel gate size 5mx1.8 with Steel work in built up tubular with Outer Frame size 80x40x3.20mm,Vertical member size 32x32x2.60mm necessary hinges provided for fixing boundary wall locking access and tower bolt etc (3part) (round, square or rectangular hollow tubes etc.) trusses etc., including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc.complete as specified design						
	Providing steel gate size 5mx1.8 with Steel work in built up tubular with Outer Frame size 80x40x3.20mm,Vertical member size						
		1					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
2.063	OD152592/2022-2023						
	Fabricating and providing steel fencing over the boundary wall with Vertical member size 16mm square rod,Horizontal member 3nos size 12mm square rod,Sharpen arrow size 50x50mm with 4mm ms plate welded over the vertical member fixing over the boundary wall prime coat etc.. complete						
	Providing steel gate size 5mx1.8 with Steel work in built up tubular with Outer Frame size 80x40x3.20mm,Vertical member size						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
		457					457.000
	Total						**457.000**
						Total Quantity in metre	**457.000**
2.064	OD152593/2022-2023						
	Providing steel grating over the cable duct , required size and length with size 25x25x2.6mm rectangular section length-0.55m for cross bar and size 50x25x3.2mm rectangular section to fixing cross bar welded each other as specified design finished prime coat and placing etc.						
	Providing steel grating over the cable duct , required size and length with size 25x25x2.6mm rectangular section length-						
		1	4.5+4.5+ 2+2				13.000
	Total						**13.000**
						Total Quantity in metre	**13.000**
2.065	9.120.2						
	Providing and fixing factory made panel PVC door shutter consisting of frame made out of M.S. tubes of 19 gauge thickness and sized of 19 mm x 19 mm for styles and 15x15 mm for top & bottom rails. M.S. frame shall have a coat of steel primers of approved make and manufacture. M.S. frame covered with 5 mm thick heat moulded PVC 'C' channel of size 30 mm thickness, 70 mm width out of whicj 50 mm shall be flat and 20 mm shall be tapered in 45 degree angle on both side forming styles and 5mm thick, 95 mm wide PVC sheet out of which75 mm shall be tapered in 45 degree on th inner side to form top and bottom rail and 115 mm wide PVC sheet out of which 75 mm shall be flat and 20 mm shall be tapered on both sides to form lock rail. Top, bottom and lock rails shall be provided both side of the panel. 10 mm (5 mmx2) thick, 20 mm wide cross PVC sheet be provided as gap insert for top rail & bottom rail. paneling of 5 mm thick both side PVC sheet to be fitted in the M.S. frame welded /sealed to the styles & rails with 7 mm (5 mm + 2 mm) thick x 15 mm wide PVC sheet beading on inner side, and joined together with solvent cement adhesive. An additional 5 mm thick PVC strip of 20 mm width is to be stuck on the interior side of the 'C' Channel using PVC solvent adhesive etc. complete as per direction of Engineer -in-charge, manufacture's specification & drawing.30 mm thick pre laminated PVC door shutters						
	Providing and fixing factory made panel PVC door shutter consisting of frame made out of M.S. tubes of 19 gauge thickness and sized of 19 mm x 19 mm for styles and 15x15 mm for top &						
	door for new bathroom	1	0.800		2.100		1.680
	Total						**1.680**
						Total Quantity in sqm	**1.680**
2.066	16.91.2						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Providing and laying factory made chamfered edge Cement Concrete paver blocks in footpath, parks, lawns, drive ways or light traffic parking etc, of required strength, thickness & size/ shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50mm thick compacted bed of sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand. complete all as per direction of Engineer-in-Charge.80 mm thick C.C. paver block of M-30 grade with approved color design and pattern.						
	yard beautification						
	way and yard of PH	1	22.000	17.000			374.000
	pathway	1	60.000	2.000			120.000
	well	-1	3.14/4	7.60*7.60			-45.342
	Total						**448.658**
						Total Quantity in sqm	**448.658**
2.067	50.10.2						
	Steel work for purlin/single section with G I pipes including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc. complete						
	Pump house						
	horizontal pole for truss holding section 80mm dia tube	1	5.150	8.360		1.050000	45.207
	horizontal pole for truss holding section 80mm dia tube	4	3.150	8.360		1.050000	110.603
	Total						**155.810**
						Total Quantity in kg	**155.810**
2.068	50.10.1						
	Steel work in built up G I tubular (round, square or rectangular hollow tubes etc.) trusses etc., including cutting, hoisting,fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc. complete						
	Pump house						
	bottom and top of truss 60*40*3.6mm	40	3.650	4.930		1.050000	755.769
	support of bottomcord and topof truss 50*25*3.2mm tube	220	0.430	3.240		1.050000	321.829

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	purlin 50*20*3.2	52	5.600	3.240	1.050		990.662
	Total						**2068.260**
						Total Quantity in kg	**2068.260**
2.069	12.1.2						
	Providing corrugate G.S. sheet roofing including vertical/ curved surface fixed with polymer coated J or L hooks, bolts and nuts 8 mm diameter with bitumen and G.I. limpet washers or with G.I. limpet washers filled with white lead, including a coat of approved steel primer and two coats of approved paint on overlapping of sheets complete (up to any pitch in horizontal / vertical or curved surfaces), excluding the cost of purlins, rafters and trusses and including cutting to size and shape wherever required.0.80 mm thick with zinc coating less than 275 gm/m2						
	Providing corrugate G.S. sheet roofing including vertical/ curved surface fixed with polymer coated J or L hooks,						
		1	5.500	3.600			19.800
	Total						**19.800**
						Total Quantity in sqm	**19.800**

DRAFT
PRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

ABSTRACT ESTIMATE

Others-Sewerage Network design- Kureeppuzha west and Vallikkeezhu wards to be connected to 12 MLD STP at Kureeppuzha-Construction of Sewerage collection Well and Pump house at near STP at Kureeppuzha and allied works-Sewerage Work

Sl No	Specification	Quantity	Rate	Amount
1	**CONSTRUCTION OF WELL**			
1.001	2.31			
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared			
	Net Total	500.000sqm	@15.03/sqm	7515.00
1.002	2.33.1			
	Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth			
	Net Total	5.000each	@456.41/each	2282.05
1.003	50.2.33.7			
	Cutting branches of trees overhanging above any structures of girth between 90cm to 120cm including stacking of serviceable materials and disposal of unserviceable material, cost of labour, hire charges of rope and pully etc without making any damages to nearby structures etc complete.			
	Net Total	5.000each	@764.37/each	3821.85
1.004	2.1.1			
	Earth work in surface excavation not exceeding 30 cm in depth but exceeding 1.5m in width as well as 10 sqm on plan including disposal of excavated earth up to 50 m and lift up to 1.5 m, disposed soil to be levelled and neatly dressed:All Kinds of soil			
	Net Total	400.000sqm	@111.01/sqm	44404.00
1.005	100.3.9.1			
	Earthwork in open well excavation (above water) for wells of diameter above 9.0m and up to 12.0m in all kinds of soil and conveying and depositing the spoil within initial lead of 50m and lift up to 1.5m including neat banking.			
	Net Total	169.560cum	@455.71/cum	77270.19
1.006	100.3.9.2			
	Earthwork in open well excavation (above water) for wells of diameter above 9.0m and up to 12.0m in all kinds of soil and conveying and depositing the spoil within initial lead of 50m and lift from 1.50m to 3.00m including neat banking.			
	Net Total	169.560cum	@501.27/cum	84995.34
1.007	OD156595/2022-2023			
	Sinking wells above up to 9.00 m dia. and up to 12.00 m inside and depth up to 3.00			

Sl No	Specification	Quantity	Rate	Amount
	m below spring level in all kind of soil to lines and levels and plumb by scooping out earth from inside and below the staining using necessary appliances including hire and labor for the same including dumping the spoil beyond the initial lead of 50 m etc. complete.(for depth 3.00 m-6.00 m)			
	Net Total	3.000per metre	@160977.32/per metre	482931.96
1.008	OD156631/2022-2023			
	:Sinking wells above up to 9.00 m dia. and up to 12.00 m inside and depth up to 3.00 m below spring level in all kind of soil to lines and levels and plumb by scooping out earth from inside and below the staining using necessary appliances including hire and labor for the same including dumping the spoil beyond the initial lead of 50 m etc. complete.(for depth 6.00 m-9.00 m)			
	Net Total	2.150per metre	@186734.05/per metre	401478.21
1.009	OD157007/2022-2023			
	:Sinking wells above up to 9.00 m dia. and up to 12.00 m inside and depth up to 3.00 m below spring level in ordinary rock to lines and levels and plumb by scooping out earth from inside and below the staining using necessary appliances including hire and labor for the same including dumping the spoil beyond the initial lead of 50 m etc. complete.(for depth 6.00 m-9.00 m)			
	Net Total	0.500per metre	@186734.05/per metre	93367.03
1.010	OD152574/2022-2023			
	:Fabricating MS Kerb of size using 8 mm thick MS plate including cost ms plate and 10mm dia anger bar welded to the kerb and conveyance charges of MS plate,all fabrication charges, charges of painting outer side of the steel work with two or more coat deluxe multi surface paint to give an even shade over an under coat of primer erection tying anger bar with reinforcement placing in position etc complete:			
	Net Total	29.830metre	@6570.74/metre	196005.17
1.011	2.17.1			
	Close timbering in case of shafts, wells, cesspits, manholes and the like including strutting, shoring and packing cavities (wherever required) etc. complete (Measurements to be taken of the face area timbered).Depth not exceeding 1.5 m			
	Net Total	56.520sqm	@166.04/sqm	9384.58
1.012	100.6.1			
	Providing steel sheet shoring to the sides of the trenches to depths of above 4.00 m but not exceeding 6.00m using 6 mm M.S. sheet 0.50 M wide stiffen on edges with 50 mm x 50mm x 6 mm M.S. angles driving down vertically on either side one after another in lines and levels with suitable pile driving equipments and accessories to a maximum depth of 0.50 M below the bottom of the proposed excavation 0.5 M above ground level suitably braced by horizontal walling pieces at 75 x 150 mm x 8 mm			

Sl No	Specification	Quantity	Rate	Amount
	angles on either side at intervals not exceeding 1.50M and horizontal screw jack type struts at 1.50M intervals and maintaining the shoring till the pipes are laid and works are completed, dismantling, cleaning and restacking for reuse including all labour, hire charges and conveyance for equipments, tools and plants and sundries etc. complete.			
	Net Total	75.360sqm	@763.18/sqm	57513.24
1.013	OD156724/2022-2023			
	Dry rubble masonry with hard stone in foundation and plinth including levelling up to plinth level			
	Net Total	25.964cum	@7113.04/cum	184682.97
1.014	4.1.5			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)			
	Net Total	25.964cum	@7506.11/cum	194888.64
1.015	OD152575/2022-2023			
	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge.“(Note :- Cement content considered in this item is @ 340 kg/cum.“Excess/ less cement used as per design mix is payable/recoverable separately).			
	Net Total	247.547cum	@11357.39/cum	2811487.82
1.016	4.15			
	Extra for laying concrete in or under water and or liquid mud including cost of pumping or bailing out water and removing slush etc. complete. Note for item No. 4.15 : - The quantity will be calculated by multiplying the depth measured from the sub-soil water level upto centre of gravity of concrete under sub-soil water level with quantity of concrete in cum executed under the sub-soil water. The depth of centre of gravity shall be reconed correct to 0.10 m 0.05 m or more shall be taken as 0.10 m and less than 0.05 m ignored.			
	Net Total	257.964cum	@952.96/cum	245829.37
1.017	5.22.4			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelHot rolled deformed bars			
	Net Total	25745.700kilogram	@100.15/kilogram	2578431.86
1.018	5.3			
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of			

Sl No	Specification	Quantity	Rate	Amount
	centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).			
	Net Total	9.910cum	@11709.05/cum	116036.69
1.019	OD152582/2022-2023			
	Centering and shuttering including strutting propping etc and removal of form etc. Well Steining for circular works			
	Net Total	653.599sqm	@354.56/sqm	231740.06
1.020	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	135.059sqm	@662.02/sqm	89411.76
1.021	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	255.156sqm	@831.09/sqm	212057.60
1.022	19.16			
	Providing orange colour safety foot rest of minimum 6 mm thick plastic encapsulated as per IS: 10910 on 12 mm dia steeel bar conforming to IS:1786, having minimum cross section as 23 mm x 25 mm and over all minimum length 263 mm and width as 165 mm with minimum 112 mm space between protruded legs having 2 mm tread on top surface by ribbing or chequering besides necessary and adequate anchoring projections on tail length on 138 mm as per standard drawing and suitable to with stand the bend test and chemical resistance test as per specifications and having manufactures permanent identification mark to be visible even after fixing including fixing in manholes with 30x20x15 cm cement concrete block 1:3:6 (1cement: 3 coarse sand: 6 graded stone aggregate 20 mm nominal size) Complete as per design			
	Net Total	40.000each	@555.28/each	22211.20
1.023	14.72			
	Providing and fixing double scaffolding system (cup lock type) on the exterior side, upto seven story hight made with 40 mm dia. M.S. tube 1.5 m centre to centre, horizontal & vertical tubes joining with cup & lock system with M.S. tubes, M.S. tube challies, M.S. clamps and M.S. staricase system in the scaffolding for working platform etc. and maintaining it in a serviceable condition for the required duration as approved and removing it there after. The scaffolding system shall be stiffened with bracings, runners, connection with the building etc wherever required for inspection of work at required location with essential safety features for the workmen etc. complete as per directions and approval of Engineer- in Charge. The elevational area of the scaffolding shall be measured for payment purpose. The payment will be made once irrespective of duration of scaffolding. Note:- This item to be used for maintenance work judicially, necessary deduction for scaffolding in the existing item to be done .			
	Net Total	314.000sqm	@309.35/sqm	97135.90
1.024	13.7.1			
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1			

Sl No	Specification	Quantity	Rate	Amount
	cement : 3 fine sand)			
	Net Total	731.458sqm	@408.77/sqm	298998.09
1.025	100.98.1016			
	Engaging Mason (for ornamental stone work) Ist class.			
	Net Total	100.000no	@1184.12/no	118412.00
1.026	13.52.2			
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On concrete work			
	Net Total	136.000sqm	@227.13/sqm	30889.68
1.027	2.25			
	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m.			
	Net Total	122.538cum	@263.42/cum	32278.96
1.028	OD152583/2022-2023			
	Carriage of Material(excavated earth) By Mechanical Transport including loading,unloading and stacking up tp 5 KM			
	Net Total	699.082cum	@234.43/cum	163885.79
1.029	100.7.1			
	Bailing out water with 5HP engine and pump set including conveyance to the site, erecting, dismantling and taking back of engine and pump, cost of fuel lubricating oil and other stores pay of staff etc., complete.			
	Net Total	5968.000Kwh	@37.63/Kwh	224575.84
1.030	100.7.2			
	Bailing out water with engine and pump set above 5HP up to 10HP including conveyance to the site, erecting, dismantling and taking back of engine and pump, cost of fuel lubricating oil and other stores pay of staff etc., complete.			
	Net Total	5968.000Kwh	@18.83/Kwh	112377.44
1.031	100.98.1008			
	Engaging Coolie.			
	Net Total	100.000no	@895.31/no	89531.00
1.032	10.26.3			
	Providing and fixing hand rail of approved size by welding etc. to steel ladder railing, balcony railing, staircase railing and similar works, including applying priming coat of approves steel primer.G.I. pipes			
	Net Total	600.000kg	@189.50/kg	113700.00
1.033	18.68.2			
	Providing and laying D.I specials of class K - 12 suitable for push - on jointing as per IS : 9523 :Above 600 mm dia			
	Net Total	1.920quintal	@28201.56/quintal	54147.00

Sl No	Specification	Quantity	Rate	Amount
1.034	18.69.2			
	Providing and laying D.I Specials of Class K - 12 suitable for mechanical jointing as per IS : 9523 :Above 600 mm dia			
	Net Total	1.120quintal	@30688.53/quintal	34371.15
1.035	OD152584/2022-2023			
	Fabricating MS Base plate using 12 mm thick MS plate including cost and conveyance charges of MS plate,all fabrication charges, charges of painting the steel work with two or more coat deluxe multi surface paint to give an even shade over an under coat of primer etc complete.			
	Net Total	4.000no	@2818.03/no	11272.12
1.036	OD152585/2022-2023			
	Supplying fabricating fixing I section for column no: B Size ISMB 250X125X12mm, Length- 5.20m, Supporting section ISLB 100X50X10mm 1m long, welded with MS plate size 300x300x12mm and 150x150mmx2nos with necessary ss fasteners priming coat etc.			
	Net Total	1.000no	@28160.59/no	28160.59
1.037	OD152586/2022-2023			
	Supplying fabricating fixing I section for column no:A with ISMB250X125X12mm of 4.00m long welded with MS plate size 400X400X12mm 2nos and fixing to the RCC priming coating finishing etc as specified desighn.. 			
	Net Total	1.000no	@21135.27/no	21135.27
1.038	OD152587/2022-2023			
	Supplying fabricating fixing Girder over the column with ISMB 250X125X12mm and 10m long , MS Plate for end close 12mm size 250x250mm . Providing movable Chain pulley through the flange of the Girder and capable to carry 3tonne with 10m chain necessary flanges fastening with the column structure with weld and bolt nut end closer with 12mm plate prime coat etc complete			
	Net Total	1.000no	@48094.55/no	48094.55
1.039	OD157280/2022-2023			
	Supplying and fixing 3 T capacity gantry crane Manually operated having 2D movement at the Raw water pump house capable to lift the pumps and all accessories .The crane should be fixed so that the loading materials can be directly loaded to the vehicle			
	Net Total	1.0001 nos	@348450.00/1 nos	348450.00
1.040	OD152588/2022-2023			

Sl No	Specification	Quantity	Rate	Amount
	Providing structural steel work for providing roof over the girder to prevent the corrosion with tubular sections 60x40x3.6mm,40x40x3.2mm, 50x25x3.2mm and 25x25x2.6mm welded each other and placed and welded over the I section necessary prime coat etc.. complete as specified design			
	Net Total	15.000metre	@6444.99/metre	96674.85
1.041	OD152589/2022-2023			
	Providing and fixing stainless steel (Grade 304) railing made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners , stainless steel bolts etc., of required size, on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge,(for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.).			
	Net Total	49.999sqm	@6367.27/sqm	318357.13
1.042	13.46.1			
	Finishing walls with Acrylic Smooth exterior paint of required shade:New work (Two or more coat applied @ 1.67 ltr/10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/10 sqm)			
	Net Total	75.000sqm	@197.53/sqm	14814.75
1.043	13.62.1			
	Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade:Two or more coats on new work over an under coat of suitable shade with ordinary paint of approved brand and manufacture .			
	Net Total	75.000sqm	@212.46/sqm	15934.50
	Heading Total(Rs)			10420943.20
2	**Construction of Valve Chamber,Cable duct,Pump House and connected works**			
2.001	2.8.1			
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil			
	Net Total	82.590cum	@302.57/cum	24989.26
2.002	OD152590/2022-2023			
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means in foundation trenches of manholes or drains (exceeding 1.5 m in width or 10 sqm on			

Sl No	Specification	Quantity	Rate	Amount
	plan) including dressing of sides and ramming of bottom,including getting out the excavated soil and disposal of surplus excavated soil as directed, with in a lead of 50 m for depth exceeding 1.50m but not exceeding 3.00m			
	Net Total	18.800cum	@410.94/cum	7725.67
2.003	2.17.1			
	Close timbering in case of shafts, wells, cesspits, manholes and the like including strutting, shoring and packing cavities (wherever required) etc. complete (Measurements to be taken of the face area timbered).Depth not exceeding 1.5 m			
	Net Total	91.500sqm	@166.04/sqm	15192.66
2.004	2.17.2			
	Close timbering in case of shafts, wells, cesspits, manholes and the like including strutting, shoring and packing cavities (wherever required) etc. complete (Measurements to be taken of the face area timbered).Depth exceeding 1.5 m but not exceeding 3 m			
	Net Total	39.200sqm	@194.90/sqm	7640.08
2.005	4.1.8			
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)			
	Net Total	9.574cum	@6943.04/cum	66472.66
2.006	5.1.2			
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size			
	Net Total	20.274cum	@9255.99/cum	187655.94
2.007	5.2.2			
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)			
	Net Total	3.036cum	@11160.03/cum	33881.85
2.008	5.3			
	Reinforced cement concrete work in beams, suspended floors, roofs, having slope up to 15⁰ landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement, with1:1.5:3 (1 cement : 1.5 coarse sand (Zone III) : 3 graded stone aggregate 20 mm nominal size).			
	Net Total	11.090cum	@11709.05/cum	129853.36
2.009	5.9.1			
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	81.340sqm	@341.62/sqm	27787.37
2.010	5.9.2			
	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.			
	Net Total	86.070sqm	@730.69/sqm	62890.49
2.011	5.9.3			
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform			
	Net Total	66.680sqm	@831.09/sqm	55417.08
2.012	5.9.5			
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers			
	Net Total	19.070sqm	@662.02/sqm	12624.72
2.013	5.9.6			
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts			
	Net Total	35.532sqm	@879.86/sqm	31263.19
2.014	5.22.4			
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelHot rolled deformed bars			
	Net Total	4128.000kilogram	@100.15/kilogram	413419.20
2.015	9.1.1			
	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately).Second class teak wood			
	Net Total	0.500cum	@156119.69/cum	78059.85
2.016	9.5.1.1			
	Providing and fixing panelled or panelled and glazed shutters for shutters for doors, windows and clerestory windows, including ISI marked M.S. pressed butt hinges bright finished of required size with necessery screws, excluding panelling which will be paid for separately, all complete as per direction of Engineer - in-charge. Second class teak wood35 mm thick shutters			
	Net Total	13.050sqm	@4399.34/sqm	57411.39
2.017	19.16			
	Providing orange colour safety foot rest of minimum 6 mm thick plastic encapsulated as per IS: 10910 on 12 mm dia steeel bar conforming to IS:1786, having minimum cross section as 23 mm x 25 mm and over all minimum length 263 mm and width as 165 mm with minimum 112 mm space between protruded legs having 2 mm tread on top surface by ribbing or chequering besides necessary and adequate anchoring			

Sl No	Specification	Quantity	Rate	Amount
	projections on tail length on 138 mm as per standard drawing and suitable to with stand the bend test and chemical resistance test as per specifications and having manufactures permanent identification mark to be visible even after fixing including fixing in manholes with 30x20x15 cm cement concrete block 1:3:6 (1cement: 3 coarse sand: 6 graded stone aggregate 20 mm nominal size) Complete as per design			
	Net Total	9.000each	@555.28/each	4997.52
2.018	13.7.1			
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)			
	Net Total	47.700sqm	@408.77/sqm	19498.33
2.019	7.7.1			
	Coursed rubble masonry (second sort) with hard stone in foundation & plinth with:Cement mortar 1:6 (1 cement : 6 coarse sand)			
	Net Total	32.064cum	@8161.05/cum	261675.91
2.020	50.6.1.2			
	Solid block masonry using pre cast solid blocks (Factory made) of size 40x20x20cm or nearest available size confirming to IS 2185 part I of 1979 for super structure up to floor two level thickness 20cm and above in: CM 1:6 (1 cement: 6 coarse sand) etc complete.			
	Net Total	32.480cum	@6664.83/cum	216473.68
2.021	13.9.1			
	Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.12 mm cement plaster			
	Net Total	384.500sqm	@419.89/sqm	161447.71
2.022	13.9.2			
	Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.20 mm cement plaster			
	Net Total	83.660sqm	@552.45/sqm	46217.97
2.023	13.60.1			
	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade:Two or more coats on new work			
	Net Total	384.500sqm	@154.27/sqm	59316.82
2.024	4.2.3			
	Providing and laying cement concrete in retaining walls, return walls, walls (any thickness) including attached pilasters, columns, piers, abutments, pillars, posts, struts,buttresses, string or lacing courses, parapets, coping, bed blocks, anchor blocks, plain window sills, fillets, sunken floor, etc. up to floor five level, excluding the cost of centering, shuttering and finishing:1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)			
	Net Total	32.232cum	@10258.84/cum	330662.93
2.025	11.40			
	Providing and laying rectified Glazed Ceramic floor tiles of size 300x300 mm or			

Sl No	Specification	Quantity	Rate	Amount
	more (thickness to be specified by the manufacturer) of Ist quality conforming to IS: 15622 of approved make in all colours, shades, except white, Ivory, Grey Fume Red Brown, laid on 20 mm thick cement mortar 1:4 (1 Cement : 4 Coarse sand) including pointing the joints with white cement and matching pigments etc., complete.			
	Net Total	14.780sqm	@1403.92/sqm	20749.94
2.026	11.41.2			
	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS : 15622, of approved make, in all colours and shades, laid on 20 mm thick cement mortar 1:4(1 cement : 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.Size of Tile 600 x 600 mm.			
	Net Total	117.000sqm	@1799.51/sqm	210542.67
2.027	17.1.1			
	Providing and fixing water closet squatting pan (Indian type W.C. pan) with 100 mm Sand Cast Iron P or S trap, 10 litter low level white P.V.C.flushing cistern, including flush pipe, manually controlled device (handle lever) conforming to IS : 7231, with all fittings and fixtures complete, including cutting and making good the walls and floors wherever require:White Vitreous china Orissa pattern W.C. pan of size 580x440 mm with integral type foot rests			
	Net Total	1.000each	@6501.64/each	6501.64
2.028	17.7.3			
	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:White Vitreous China Wash basin size 550x400 mm with a pair of 15 mm C.P. brass pillar taps			
	Net Total	1.000each	@3414.09/each	3414.09
2.029	50.18.8.2.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work,including cutting chased and making good the wall etc. 20 mm pipe 12 Kgf/cm2			
	Net Total	5.000metre	@416.10/metre	2080.50
2.030	50.18.8.8.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chases and making good the wall etc. 75 mm pipe 6 Kgf/cm2			
	Net Total	2.000metre	@631.65/metre	1263.30
2.031	50.18.8.9.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge. Concealed work, including cutting chased and making good the wall etc. 110 mm pipe 6kgf/cm2			

Sl No	Specification	Quantity	Rate	Amount
	Net Total	2.000metre	@731.65/metre	1463.30
2.032	50.18.9.4.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge.32 mm dia 10.Kgf/cm2			
	Net Total	25.000metre	@241.59/metre	6039.75
2.033	50.18.9.5.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching refilling & testing of joints complete as per direction of Engineer in Charge 40 mm dia 10Kgf/cm2			
	Net Total	50.000metre	@278.87/metre	13943.50
2.034	50.18.9.8.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. 75 mm dia 6 Kgf/ cm2			
	Net Total	5.000metre	@364.18/metre	1820.90
2.035	50.18.9.9.1			
	Providing and fixing PVC pipes includings jointing of pipes with one step PVC solvent cement, trenching, refilling & testing of Joints complete as per direction of engineer in charge.110 mm dia 6Kgf/cm2			
	Net Total	30.000metre	@531.23/metre	15936.90
2.036	50.18.9.13.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 25 mm dia 12 Kgf/ cm2- External work- exposed on wall			
	Net Total	5.000metre	@297.24/metre	1486.20
2.037	50.18.9.14.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 32 mm dia 10 Kgf/cm2 - External work- Exposed on wall			
	Net Total	5.000metre	@331.68/metre	1658.40
2.038	50.18.9.15.1			
	Providing and fixing PVC pipes, fittings including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 40 mm dia 10Kgf/cm2- External work- Exposed on wall			
	Net Total	10.000metre	@422.92/metre	4229.20
2.039	50.18.9.17.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/ clip at 1.00 m spacing . This includes jointing of pipes with one step PVC solvent cement and			

Sl No	Specification	Quantity	Rate	Amount
	testing of joints complete as per direction of Engineer-in-Charge 63 mm dia 6 Kgf/cm2 - External work - Exposed on wall			
	Net Total	3.000metre	@270.65/metre	811.95
2.040	50.18.9.19.1			
	Providing and fixing PVC pipes including fixing the pipe with clamps/ clips/ at 1.00 m spacing . This includes jointing of pipes with one step PVC solvent cement and testing of joints complete as per direction of Engineer-in-Charge 110 mm dia 6 Kgf/cm2 - External work- Exposed on wall			
	Net Total	5.000metre	@384.07/metre	1920.35
2.041	50.18.9.20.1			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 63 mm dia Elbow			
	Net Total	2.000no	@73.64/no	147.28
2.042	50.18.9.20.3			
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 63 mm dia Door Elbow			
	Net Total	1.000no	@81.19/no	81.19
2.043	50.18.9.22.6			
	Providing and fixing PVC moulded fittings/accessories for Rigid PVC pipes, including jointing with PVC solvent cement - 110x110x110 mm dia Door tee			
	Net Total	1.000no	@188.43/no	188.43
2.044	50.18.9.22.8			
	Providing and fixing PVC moulded fittings /accessories for Rigid PVC pipes, including jointing with PVC solvent cement -110 mm dia Vent cowl			
	Net Total	1.000no	@124.69/no	124.69
2.045	50.18.9.22.9			
	Providing and fixing PVC moulded fittings/ accessories for Rigid PVC pipes, including jointing with PVC solvent cement -110 mm dia offset			
	Net Total	2.000no	@165.34/no	330.68
2.046	18.48			
	Providing and placing on terrace (at all floor levels) polyethylene water storage tank :ISI 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.			
	Net Total	2000.000Litre	@10.57/Litre	21140.00
2.047	50.17.1.3			
	Supplying and fixing CP Towel rod 60cm or nearest available length including cost of materials and labour charges etc complete as per the direction of site Engineer-in-charge.			
	Net Total	1.000no	@128.37/no	128.37
2.048	50.17.1.4			

Sl No	Specification	Quantity	Rate	Amount
	Supplying and fixing CP Health faucet good quality including cost of materials and labour charges etc. complete as per the direction of site engineer-in-charge.			
	Net Total	1.000no	@758.18/no	758.18
2.049	18.50.1			
	Providing and fixing C.P brass long nose bib cock of approved quality conforming to IS standards and weighing not less than 810 gms.15 mm nominal bore			
	Net Total	1.000each	@742.09/each	742.09
2.050	18.64			
	Providing and fixing PTMT swivelling shower, 15 mm nominal bore, weighing not less than 40 gms.			
	Net Total	1.000no	@134.01/no	134.01
2.051	18.17.1			
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :25 mm nominal bore			
	Net Total	5.000each	@596.21/each	2981.05
2.052	18.18.1			
	Providing and fixing ball valve (brass) of approved quality, High or low pressure, with plastic floats complete:15 mm nominal bore			
	Net Total	1.000each	@406.19/each	406.19
2.053	18.21.2.1			
	Providing and fixing uplasticised PVC connection pipe with brass unions: 45 cm length15 mm nominal bore			
	Net Total	1.000each	@99.54/each	99.54
2.054	18.52.1			
	Providing and fixing C.P brass stop cock (concealed) of standard design and of approved make conforming to IS: 893115 mm nominal bore			
	Net Total	1.000each	@727.06/each	727.06
2.055	18.53.1			
	Providing and fixing C.P. brass angle valve for basin mixer and geyser points of approved quality conforming to IS: 893115 mm nominal bore			
	Net Total	1.000each	@637.99/each	637.99
2.056	18.58.2.1			
	Providing and fixing PTMT grating of approved quality and colour. Rectangular type with openable circular lid150 mm nominal size square 100 mm diameter of the inner hinged round grating			
	Net Total	1.000each	@202.68/each	202.68
2.057	14.54.1			
	Painting with synthetic enamel paint of approved brand and manufacture of required colour to an give even shade:One or more coats on old work			
	Net Total	32.535sqm	@95.88/sqm	3119.46

Sl No	Specification	Quantity	Rate	Amount
2.058	19.30.1.1			
	Constructing brick masonry chamber for underground C.I. inpection chamber and bends with bricks in cement mortar 1:4 (1 cement: 4 coarse sand) C.I.cover with frame (light duty) 455x610 mm internal dimensions, total weight of cover with frame to be not less than 38 kg (weight of cover 23kg and weight of frame 15 kg), R.C.C top slab with 1:2:4 mix (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm nominal size) foundation concrete 1:5:10 (1 cement: 5 fine sand: 10 graded stone aggregate 40 mm nominal size), inside plastering 12 mm thick with cement mortar 1:3 (1 cement: 3 coarse sand) finished smooth with a floating coat of neat cement on walls and bed concrete etc. complete as per standard design: Inside dimensions 455x610 mm and 45 cm deep for single pipe line:With common burnt clay F.P.S. (non modular) bricks of class designation 7.5			
	Net Total	3.000each	@7110.12/each	21330.36
2.059	13.47.1			
	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:New work (Two or more coats applied @ 1.43 ltr/ 10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)			
	Net Total	122.850sqm	@193.27/sqm	23743.22
2.060	13.51.2			
	Painting with silicon & acrylic emulsion based water thinnable sealer of approved brand and manufacture on wet or patchy portion of plastered surfaces:Two coats			
	Net Total	99.400sqm	@154.73/sqm	15380.16
2.061	13.62.1			
	Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade:Two or more coats on new work over an under coat of suitable shade with ordinary paint of approved brand and manufacture .			
	Net Total	399.113sqm	@212.46/sqm	84795.55
2.062	OD152591/2022-2023			
	Providing steel gate size 5mx1.8 with Steel work in built up tubular with Outer Frame size 80x40x3.20mm,Vertical member size 32x32x2.60mm necessary hinges provided for fixing boundary wall locking access and tower bolt etc (3part) (round, square or rectangular hollow tubes etc.) trusses etc., including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc.complete as specified design			
	Net Total	1.000no	@48696.38/no	48696.38
2.063	OD152592/2022-2023			
	Fabricating and providing steel fencing over the boundary wall with Vertical member size 16mm square rod,Horizontal member 3nos size 12mm square rod,Sharpen arrow size 50x50mm with 4mm ms plate welded over the vertical member fixing over the boundary wall prime coat etc.. complete			
	Net Total	457.000metre	@1244.19/metre	568594.83
2.064	OD152593/2022-2023			
	Providing steel grating over the cable duct , required size and length with size			

Sl No	Specification	Quantity	Rate	Amount
	25x25x2.6mm rectangular section length-0.55m for cross bar and size 50x25x3.2mm rectangular section to fixing cross bar welded each other as specified design finished prime coat and placing etc.			
	Net Total	13.000metre	@3779.05/metre	49127.65
2.065	9.120.2			
	Providing and fixing factory made panel PVC door shutter consisting of frame made out of M.S. tubes of 19 gauge thickness and sized of 19 mm x 19 mm for styles and 15x15 mm for top & bottom rails. M.S. frame shall have a coat of steel primers of approved make and manufacture. M.S. frame covered with 5 mm thick heat moulded PVC 'C' channel of size 30 mm thickness, 70 mm width out of whicj 50 mm shall be flat and 20 mm shall be tapered in 45 degree angle on both side forming styles and 5mm thick, 95 mm wide PVC sheet out of which75 mm shall be tapered in 45 degree on th inner side to form top and bottom rail and 115 mm wide PVC sheet out of which 75 mm shall be flat and 20 mm shall be tapered on both sides to form lock rail. Top, bottom and lock rails shall be provided both side of the panel. 10 mm (5 mmx2) thick, 20 mm wide cross PVC sheet be provided as gap insert for top rail & bottom rail. paneling of 5 mm thick both side PVC sheet to be fitted in the M.S. frame welded /sealed to the styles & rails with 7 mm (5 mm + 2 mm) thick x 15 mm wide PVC sheet beading on inner side, and joined together with solvent cement adhesive. An additional 5 mm thick PVC strip of 20 mm width is to be stuck on the interior side of the 'C' Channel using PVC solvent adhesive etc. complete as per direction of Engineer -in-charge, manufacture's specification & drawing.30 mm thick pre laminated PVC door shutters			
	Net Total	1.680sqm	@2906.19/sqm	4882.40
2.066	16.91.2			
	Providing and laying factory made chamfered edge Cement Concrete paver blocks in footpath, parks, lawns, drive ways or light traffic parking etc, of required strength, thickness & size/ shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50mm thick compacted bed of sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand. complete all as per direction of Engineer-in-Charge.80 mm thick C.C. paver block of M-30 grade with approved color design and pattern.			
	Net Total	448.658sqm	@1142.87/sqm	512757.77
2.067	50.10.2			
	Steel work for purlin/single section with G I pipes including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc. complete			
	Net Total	155.810kg	@155.21/kg	24183.27
2.068	50.10.1			
	Steel work in built up G I tubular (round, square or rectangular hollow tubes etc.) trusses etc., including cutting, hoisting,fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc. complete			
	Net Total	2068.260kg	@193.47/kg	400146.26

Sl No	Specification	Quantity	Rate	Amount
2.069	12.1.2			
	Providing corrugate G.S. sheet roofing including vertical/ curved surface fixed with polymer coated J or L hooks, bolts and nuts 8 mm diameter with bitumen and G.I. limpet washers or with G.I. limpet washers filled with white lead, including a coat of approved steel primer and two coats of approved paint on overlapping of sheets complete (up to any pitch in horizontal / vertical or curved surfaces), excluding the cost of purlins, rafters and trusses and including cutting to size and shape wherever required.0.80 mm thick with zinc coating less than 275 gm/m2			
	Net Total	19.800sqm	@1273.36/sqm	25212.53
			Heading Total(Rs)	4417237.50
			Total Estimation PAC	14838180.70
4	**Extra Charges**			
3.001	Provision for GST			
		14838180.70	0.00%	0.00
			Grand Total	0.00
			Round off	0.00
			Rounded Total(Rs)	14838180.70
	Rupees One Crore Forty Eight Lakh Thirty Eight Thousand One Hundred and Eighty			

e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

DETAILED ESTIMATE

Others-Sewerage Network design- Kureeppuzha west and Vallikkeezhu wards to be connected to 12 MLD STP at Kureeppuzha-Providing and Laying of HDPE PE-100/PN-8 pipe for Sewer Network and Construction of Manhole Chamber -Sewerage Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Providing and Laying HDPE Pipes						
1.001	100.59.1						
	Cutting the bituminous / concrete roads with cutting machine for a minimum depth of 200mm along the sides of proposed alignment of the pipe to be laid without causing any damage to other utilities, including the charges for hire and conveyance of tools and plant, cost of consumables and charges for lighting, watching, ribbon fencing, caution boards, traffic diversion, and as per the direction of departmental officers etc. complete, before carrying out the demolition of bituminous / concrete road by mechanical means and carrying out the excavation.						
	For laying 225,280,355,450 & 560mm HDPE Pipe						
	Concrete Road + Tar Road	2	13751.000				27502.000
	Total						**27502.000**
						Total Quantity in metre	**27502.000**
1.002	15.43.2						
	Dismantling manually / by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer -in-Charge:Bituminous road						
	For HDD Method						
	Entry pit and Exit pit for HDD method in various roads of Cluster-I	1	400.000				400.000
	Total						**400.000**
	For laying HDPE Pipe						
	Concrete Road + Tar Road	1	13751.000	1.000	0.150		2062.650
	Total						**2062.650**
						Total Quantity in sqm	**2462.650**
1.003	100.1.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Excavating trenches of required width for pipes, cables, etc., including excavation for sockets, and dressing of sides, ramming of bottoms, depth up to 1.5m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating each deposited layer by ramming, watering, etc., and disposing of surplus excavated soil as directed, within a lead of 50m, in all kinds of soil.						
	For laying HDPE 1 st lift						
	225 mm HDPE	1	7783+5921	0.800	1.500		16444.800
	560 mm HDPE	1	47.000	1.600	1.500		112.800
	Total						**16557.600**
	Deduct ordinary Rock						
	Qty of Item no.5	-1	785.586	1.000			-785.586
	Total						**-785.586**
						Total Quantity in cum	**15772.014**
1.004	100.1.2						
	Excavating trenches of required width for pipes, cables, etc., including excavation for sockets, and dressing of sides, ramming of bottoms, depth exceeding 1.5m but not exceeding 3m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating each deposited layer by ramming, watering, etc., and disposing of surplus excavated soil as directed, within a lead of 50m, in all kinds of soil.						
	For laying HDPE Pipe Upto 2.30m depth						
	225 mm	1	5921.000	0.800	0.800		3789.440
	560 mm	1	47.000	1.600	0.800		60.160
	Total						**3849.600**
	Deduct ordinary Rock						
	Qty of Item no. 6	-1	344.722				-344.722
	Total						**-344.722**
						Total Quantity in cum	**3504.878**
1.005	100.1.5						
	Excavating trenches of required width for pipes, cables, etc., including excavation for sockets, and dressing of sides, ramming of bottoms, depth up to 1.5m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating each deposited layer by ramming, watering, etc., and disposing of surplus excavated soil as directed, within a lead of 50 m, in Ordinary Rock.						
	For laying HDPE Pipe - Ordinary rock						
	5% item No.3	1	15711.724			0.050000	785.586
	Total						**785.586**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**785.586**
1.006	100.1.6						
	Excavating trenches of required width for pipes, cables, etc., including excavation for sockets, and dressing of sides, ramming of bottoms, depth exceeding 1.5m but not exceeding 3m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating each deposited layer by ramming, watering, etc., and disposing of surplus excavated soil as directed, within a lead of 50m, in Ordinary Rock.						
	For laying HPDP Pipe - Ordinary rock						
	10% of Item No.4	1	3447.220			0.100000	344.722
	Total						**344.722**
						Total Quantity in cum	**344.722**
1.007	100.8.1						
	Fencing one side of trenches, 1.50m height with two rows of 10cm plastic caution tape in vertical casuarina pole (girth 15cm to 24cm) fixed at 2m intervals.						
	For laying HDPE Pipe						
	35% of total road length should be taken	1	22388.000			0.350000	7835.800
	Total						**7835.800**
						Total Quantity in metre	**7835.800**
1.008	100.8.2						
	Fencing 1.50m high with two rows of casuarina poles (girth 15cm to 24cm) tied with coir yarn on vertical casuarina pole (girth 15cm to 24cm) fixed at 1.5m intervals.						
	For laying HDPE Pipe						
	65% of total road length should be taken	1	22388.000			0.650000	14552.200
	Total						**14552.200**
						Total Quantity in metre	**14552.200**
1.009	2.16.1						
	Close timbering in trenches including strutting, shoring and packing cavities (wherever required) complete (Measurements to be taken of the face area timbered).Depth not exceeding 1.5m						
	For laying HDPE Pipe						
	25% of total road length should be taken	2	13751.000		1.500	0.250000	10313.250
	Total						**10313.250**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in sqm	**10313.250**
1.010	2.16.2						
	Close timbering in trenches including strutting, shoring and packing cavities (wherever required) complete (Measurements to be taken of the face area timbered).Depth exceeding 1.5 m but not exceeding 3 m						
	For laying HDPE pipe						
	length of road up to 2.3m depth	2	5921+47		1.000	1.000000	11936.000
	Total						**11936.000**
						Total Quantity in sqm	**11936.000**
1.011	100.10.8						
	Laying HDPE pipes (IS : 4984) on land portion including conveying within initial lead and aligning the pipes, electro-fusion welding using automatic or semi-automatic electrofusion machines, testing the pipeline thus fabricated to suit the hydraulic working pressure and after testing, aligning the pipeline, lowering the pipe in position into the trenches already made, testing the line to suitable pressure with potable water before back filling and levelling the trenches including all labour charge, hire for appliances etc., complete but excluding cost of pipe and fittings: 225mm Nominal Outside Diameter Pipes.						
	For laying HDPE Pipe						
	225mm	1	7783+5921				13704.000
	Total						**13704.000**
						Total Quantity in metre	**13704.000**
1.012	100.10.16						
	Laying HDPE pipes (IS : 4984) on land portion including conveying within initial lead and aligning the pipes, electro-fusion welding using automatic or semi-automatic electrofusion machines, testing the pipeline thus fabricated to suit the hydraulic working pressure and after testing, aligning the pipeline, lowering the pipe in position into the trenches already made, testing the line to suitable pressure with potable water before back filling and levelling the trenches including all labour charge, hire for appliances etc., complete but excluding cost of pipe and fittings: 560mm Nominal Outside Diameter Pipes.						
	For laying HDPE Pipe						
	560mm	1	47.000				47.000
	Total						**47.000**
						Total Quantity in metre	**47.000**
1.013	OD150060/2022-2023						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Laying and installation of HDPE- 225mm dia, PE-100, (PN-8)- IS-14333 pipe by horizontal directional drilling method in all types of soil above/below water table up to 8m depth for gravity sewer including preparing, and setting up the plant and equipment , installing new pipe work, testing and commissioning including cost of pipe all related civil/mechanical works like entry/exit pits as necessary. De watering, drilling, stringing, reaming, pulling back the new pipe on the designed alignment and monitoring by approved guidance system. Wastage of pipes, proper disposal of drilling fluid/bentonite slurry. Proper back filling of pit and holes by approved borrow material as per specification, approved method statement or as directed by Engineer in charge.						
	Laying 225mm HDPE pipe						
		1	6106.000				6106.000
	Total						**6106.000**
						Total Quantity in metre	**6106.000**
1.014	OD150061/2022-2023						
	Laying and installation of HDPE- 280mm dia, PE-100, (PN-8)- IS-14333 pipe by horizontal directional drilling method in all types of soil above/below water table up to 8m depth for gravity sewer including preparing, and setting up the plant and equipment , installing new pipe work, testing and commissioning including cost of pipe all related civil/mechanical works like entry/exit pits as necessary. De watering, drilling, stringing, reaming, pulling back the new pipe on the designed alignment and monitoring by approved guidance system. Wastage of pipes, proper disposal of drilling fluid/bentonite slurry. Proper back filling of pit and holes by approved borrow material as per specification, approved method statement or as directed by Engineer in charge.						
	Laying 280mm HDPE pipe						
		1	366.000				366.000
	Total						**366.000**
						Total Quantity in metre	**366.000**
1.015	OD150062/2022-2023						
	Laying and installation of HDPE- 355mm dia, PE-100, (PN-8)- IS-14333 pipe by horizontal directional drilling method in all types of soil above/below water table up to 8m depth for gravity sewer including preparing, and setting up the plant and equipment , installing new pipe work, testing and commissioning including cost of pipe all related civil/mechanical works like entry/exit pits as necessary. De watering, drilling, stringing, reaming, pulling back the new pipe on the designed alignment and monitoring by approved guidance system. Wastage of pipes, proper disposal of drilling fluid/bentonite slurry. Proper back filling of pit and holes by approved borrow material as per specification, approved method statement or as directed by Engineer in charge.						
	Laying 355mm HDPE pipe						
		1	1040.000				1040.000
	Total						**1040.000**
						Total Quantity in metre	**1040.000**
1.016	OD150063/2022-2023						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Laying and installation of HDPE- 450mm dia, PE-100, (PN-8)- IS-14333 pipe by horizontal directional drilling method in all types of soil above/below water table up to 8m depth for gravity sewer including preparing, and setting up the plant and equipment , installing new pipe work, testing and commissioning including cost of pipe all related civil/mechanical works like entry/exit pits as necessary. De watering, drilling, stringing, reaming, pulling back the new pipe on the designed alignment and monitoring by approved guidance system. Wastage of pipes, proper disposal of drilling fluid/bentonite slurry. Proper back filling of pit and holes by approved borrow material as per specification, approved method statement or as directed by Engineer in charge.						
	Laying 450mm HDPE pipe						
		1	491.000				491.000
	Total						**491.000**
						Total Quantity in metre	**491.000**
1.017	OD150064/2022-2023						
	Laying and installation of HDPE- 560mm dia, PE-100, (PN-8)- IS-14333 pipe by horizontal directional drilling method in all types of soil above/below water table up to 8m depth for gravity sewer including preparing, and setting up the plant and equipment , installing new pipe work, testing and commissioning including cost of pipe all related civil/mechanical works like entry/exit pits as necessary. De watering, drilling, stringing, reaming, pulling back the new pipe on the designed alignment and monitoring by approved guidance system. Wastage of pipes, proper disposal of drilling fluid/bentonite slurry. Proper back filling of pit and holes by approved borrow material as per specification, approved method statement or as directed by Engineer in charge.						
	Laying 560mm HDPE pipe						
		1	634.000				634.000
	Total						**634.000**
						Total Quantity in metre	**634.000**
1.018	4.1.5						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	PCC for bedding in water logged area						
	For laying HDPE pipes- 15% of total length taken	1	13751.000	(0.400+1.0)/2	0.250	0.150000	360.964
	Total						**360.964**
						Total Quantity in cum	**360.964**
1.019	100.7.1						
	Bailing out water with 5HP engine and pump set including conveyance to the site, erecting, dismantling and taking back of engine and pump, cost of fuel lubricating oil and other stores pay of staff etc., complete.						
	Bailing out water during pipe laying						
		100	2.000	5.000	8.000	0.746000	5968.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**5968.000**
						Total Quantity in Kwh	**5968.000**
1.020	15.3						
	Demolishing R.C.C. work manually / by mechanical means including stacking of steel bars and disposal of unserviceable material with in 50 metres lead as per direction of Engineer -in-Charge.						
	Demolishing RCC works						
	Provision included	50					50.000
	Total						**50.000**
						Total Quantity in cum	**50.000**
1.021	16.83						
	Taking out existing CC interlocking paver blocks from footpath/ central verge, including removal of rubbish etc., disposal of unserviceable material to the dumping ground, for which payment shall be made separately and stacking of serviceable material within 50 metre lead as per direction of Engineer-in-Charge.						
	For laying HDPE Pipe in Interlock road						
		1	137510.000	1.000		0.200000	27502.000
	Total						**27502.000**
						Total Quantity in sqm	**27502.000**
1.022	16.91.1						
	Providing and laying factory made chamfered edge Cement Concrete paver blocks in footpath, parks, lawns, drive ways or light traffic parking etc, of required strength, thickness & size/ shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50mm thick compacted bed of sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand. complete all as per direction of Engineer-in-Charge.60mm thick cement concrete paver block of M-35 grade with approved colour, design & pattern.						
	Laying Interlocking Paver blocks						
	30% of Paver blocks are newly laid in total length	1	13751*0.2	1.000		0.300000	825.060
	Total						**825.060**
						Total Quantity in sqm	**825.060**
1.023	16.84						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Laying old cement concrete interlocking paver blocks of any design/ shape laid in required line, level, curvature, colour and pattern over and including 50 mm thick compacted bed of coarse sand, filling the joints with fine sand etc. all complete as per the direction of Engineer-in-charge. (Old CC paver blocks shall be supplied by the department free of cost.)						
	Laying old Interlocking Paver blocks						
	70% taking out existing CC interlocking paver blocks can be reused in total length	1	13751*0.2	1.000		0.700000	1925.140
	Total						**1925.140**
						Total Quantity in sqm	**1925.140**
1.024	OD150066/2022-2023						
	Carriage of Material(excavated earth) By Mechanical Transport including loading,unloading and stacking up tp 5 KM						
	Excavated earth						
	Volume of 225mm pipe	0.25	19810.000	0.225	0.225	3.140000	787.262
	Volume of 280mm pipe	0.25	366.000	0.280	0.280	3.140000	22.525
	Volume of 355mm pipe	0.25	1040.000	0.355	0.355	3.140000	102.887
	Volume of 450mm pipe	0.25	491.000	0.450	0.450	3.140000	78.051
	Volume of 560mm pipe	0.25	681.000	0.560	0.560	3.140000	167.646
	Volume of Quarry muck	859.438	1.000				859.438
	Total						**2017.809**
						Total Quantity in cum	**2017.809**
1.025	100.41.39						
	Supply, stacking, spreading and consolidating of Quarry Muck in the trench of pipe line, including carriage, loading, unloading & stacking up to any lead.						
	Quarry Muck						
	Quarry Muck for filling road crossings and avoid accidents	1	13751.000	1.000	0.250	0.250000	859.438
	Total						**859.438**
						Total Quantity in cum	**859.438**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
2	Construction of Manholes						
2.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	Earth work for Manholes						
	Type-I 900mm	433			1.500	2.835000	1841.333
	Type-II 1200mm	172			1.500	3.801000	980.658
	Type-III 1500mm	333			1.500	7.069000	3530.966
	Total						**6352.957**
	Deduct ordinary Rock						
	Qty vide item No-7	-63.53					-63.530
	Total						**-63.530**
						Total Quantity in cum	**6289.427**
2.002	OD150074/2022-2023						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead upto 50 m and lift 1.5 m to 3.00m as directed by Engineer-in-charge.						
	Deduct ordinary Rock,Hard Rock and Medium Rock						
	Qty vide item No-8+11+14	-150.591					-150.591
	Total						**-150.591**
	Earth work for Manholes						
	Type-I	374			0.500	2.835000	530.145
	Type-I	59			0.650	2.835000	108.722
	Type-II	172			1.300	3.801000	849.904
	Type-III	333			1.500	7.069000	3530.966
	Total						**5019.737**
						Total Quantity in cum	**4869.146**
2.003	OD150075/2022-2023						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead upto 50 m and lift 3.0 m to 4.50 m as directed by Engineer-in-charge.						
	Deduct ordinary Rock,Hard Rock and Medium Rock						
	Qty vide item No-9+12+15	-85.146					-85.146
	Total						**-85.146**
	Earth work for Manholes						
	Type-III	98			0.500	7.069000	346.381
	Type-III	235			1.500	7.069000	2491.823
	Total						**2838.204**
						Total Quantity in cum	**2753.058**
2.004	OD150076/2022-2023						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead upto 50 m and lift 4.5 m to 6.00 m as directed by Engineer-in-charge.						
	Deduct Ordinary Rock						
	Qty vide item No-10	-21.225					-21.225
	Total						**-21.225**
	Earth work for Manholes						
	Type-III	137			0.500	7.069000	484.227
	Type-III	98			1.500	7.069000	1039.143
	Total						**1523.370**
						Total Quantity in cum	**1502.145**
2.005	OD150077/2022-2023						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead upto 50 m and lift 6.0 m to 7.50 m as directed by Engineer-in-charge						
	Deduct Hard Rock & medium rock						
	Qty vide item No-13+16	-42.45					-42.450

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**-42.450**
	Earth work for Manholes						
	Type-III	75			0.500	7.069000	265.088
	Type-III	23			1.500	7.069000	243.881
	Total						**508.969**
						Total Quantity in cum	**466.519**
2.006	OD156888/2022-2023						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead upto 50 m and lift 7.5 m to 9 m as directed by Engineer-in-charge						
	Earth work						
	Type-III	18			0.500	7.069000	63.621
	Type-III	5			0.750	7.069000	26.509
	Total						**90.130**
						Total Quantity in cum	**90.130**
2.007	100.1.5						
	Excavating trenches of required width for pipes, cables, etc., including excavation for sockets, and dressing of sides, ramming of bottoms, depth up to 1.5m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating each deposited layer by ramming, watering, etc., and disposing of surplus excavated soil as directed, within a lead of 50 m, in Ordinary Rock.						
	Ordinary Rock						
	1% of Qty vide Item No.1	6352.957				0.010000	63.530
	Total						**63.530**
						Total Quantity in cum	**63.530**
2.008	100.1.6						
	Excavating trenches of required width for pipes, cables, etc., including excavation for sockets, and dressing of sides, ramming of bottoms, depth exceeding 1.5m but not exceeding 3m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating each deposited layer by ramming, watering, etc., and disposing of surplus excavated soil as directed, within a lead of 50m, in Ordinary Rock.						
	Ordinary Rock						

PRICE e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS DRAFT

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	1% of Vide item No-2	5019.737				0.010000	50.197
	Total						**50.197**
						Total Quantity in cum	**50.197**
2.009	100.1.7						
	Excavating trenches of required width for pipes, cables, etc., including excavation for sockets, and dressing of sides, ramming of bottoms, depth exceeding 3m but not exceeding 4.5m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating each deposited layer by ramming, watering, etc., and disposing of surplus excavated soil as directed, within a lead of 50m, in Ordinary Rock.						
	Ordinary Rock						
	1% of Vide item No-3	2838.204				0.010000	28.382
	Total						**28.382**
						Total Quantity in cum	**28.382**
2.010	100.1.8						
	Excavating trenches of required width for pipes, cables, etc., including excavation for sockets, and dressing of sides, ramming of bottoms, depth exceeding 4.5m but not exceeding 6.0m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating each deposited layer by ramming, watering, etc., and disposing of surplus excavated soil as directed, within a lead of 50, in Ordinary Rock.						
	Ordinary Rock						
	1% of Vide item No-4	1523.37				0.010000	15.234
	1% of Vide item No-5	508.969				0.010000	5.090
	1% of Vide item No-6	90.13				0.010000	0.901
	Total						**21.225**
						Total Quantity in cum	**21.225**
2.011	100.1.14						
	Excavating trenches of required width for pipes, cables, etc., including excavation for sockets, and dressing of sides, ramming of bottoms, depth exceeding 1.5m but not exceeding 3 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating each deposited layer by ramming, watering, etc., and disposing of surplus excavated soil as directed, within a lead of 50m, in Hard Rock where Blasting is Prohibited.						
	Hard Rock						
	1% of Vide item No-2	5019.737				0.010000	50.197
	Total						**50.197**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in cum	**50.197**
2.012	100.1.15						
	Excavating trenches of required width for pipes, cables, etc., including excavation for sockets, and dressing of sides, ramming of bottoms, depth exceeding 3m but not exceeding 4.5m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating each deposited layer by ramming, watering, etc., and disposing of surplus excavated soil as directed, within a lead of 50m, in Hard Rock where Blasting is Prohibited.						
	Hard Rock						
	1% of Vide item No-3	2838.204				0.010000	28.382
	Total						**28.382**
						Total Quantity in cum	**28.382**
2.013	100.1.16						
	Excavating trenches of required width for pipes, cables, etc., including excavation for sockets, and dressing of sides, ramming of bottoms, depth exceeding 4.5m but not exceeding 6.0m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating each deposited layer by ramming, watering, etc., and disposing of surplus excavated soil as directed, within a lead of 50m, in Hard Rock where Blasting is Prohibited.						
	Hard Rock						
	1% of Vide item No-4,5&6	2122.469				0.010000	21.225
	Total						**21.225**
						Total Quantity in cum	**21.225**
2.014	100.2.4						
	Excavating trenches of required width for pipes, cables, etc., including excavation for sockets, and dressing of sides, ramming of bottoms, depth exceeding 1.5m but not exceeding 3m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating each deposited layer by ramming, watering, etc., and disposing of surplus excavated soil as directed, within a lead of 50m, in Medium Rock Requiring Blasting.						
	Medium Rock						
	1% of Vide item No-2	5019.737				0.010000	50.197
	Total						**50.197**
						Total Quantity in cum	**50.197**
2.015	100.2.5						
	Excavating trenches of required width for pipes, cables, etc., including excavation for sockets, and dressing of sides, ramming of bottoms, depth exceeding 3.0m but not exceeding 4.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating each deposited layer by ramming, watering, etc., and disposing of surplus excavated soil as directed, within a lead of 50m, in Medium Rock Requiring Blasting.						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Medium Rock						
	1% of Vide item No-3	2838.204				0.010000	28.382
	Total						**28.382**
						Total Quantity in cum	**28.382**
2.016	100.2.6						
	Excavating trenches of required width for pipes, cables, etc., including excavation for sockets, and dressing of sides, ramming of bottoms, depth exceeding 4.5m but not exceeding 6.0m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating each deposited layer by ramming, watering, etc., and disposing of surplus excavated soil as directed, within a lead of 50m, in Medium Rock Requiring Blasting.						
	Medium Rock						
	1% of Vide item No-4,5 & 6	2122.469				0.010000	21.225
	Total						**21.225**
						Total Quantity in cum	**21.225**
2.017	OD150078/2022-2023						
	Carriage of Material(excavated earth) By Mechanical Transport including loading,unloading and stacking up tp 5 KM						
	Disposal of excavated earth,ordinary rock, medium rock and hard rock						
	Total quantity of vide iteNo-1 to 15	19333.367					19333.367
	Deduct Qty of vide item-34 (to b used for filling)	-8435.082					-8435.082
	Total						**10898.285**
						Total Quantity in cum	**10898.285**
2.018	100.4.S.1						
	Providing earth filled cement bags for protection during blasting in well in wet condition.						
	Earth filed cement bags for protection						
		800					800.000
	Total						**800.000**
						Total Quantity in no	**800.000**
2.019	100.4.S.3						
	Providing earth filled cement bags for protection during blasting in well in wet condition.						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Earth filed cement bags for protection						
		500					500.000
	Total						**500.000**
						Total Quantity in no	**500.000**
2.020	100.4.S.2						
	Labour for conveying and lowering the earth filled cement bags.						
	Labour for conveying Earthfilled cement bags						
		1200					1200.000
	Total						**1200.000**
						Total Quantity in no	**1200.000**
2.021	100.7.1						
	Bailing out water with 5HP engine and pump set including conveyance to the site, erecting, dismantling and taking back of engine and pump, cost of fuel lubricating oil and other stores pay of staff etc., complete.						
	Bailing out water during Manhole Chamber construction						
		150	5.000	5.000	8.000	0.746000	22380.000
	Total						**22380.000**
						Total Quantity in Kwh	**22380.000**
2.022	100.98.1008						
	Engaging Coolie.						
	Engaging Coolie for Bailing out water						
		150				5.000000	750.000
	Total						**750.000**
						Total Quantity in no	**750.000**
2.023	2.17.1						
	Close timbering in case of shafts, wells, cesspits, manholes and the like including strutting, shoring and packing cavities (wherever required) etc. complete (Measurements to be taken of the face area timbered).Depth not exceeding 1.5 m						
	Close Timbering for Type-I Manhole						
	50 % number of MH needed	216.5			1.500	5.969000	1938.433
	Total						**1938.433**
						Total Quantity in sqm	**1938.433**
2.024	2.17.2						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Close timbering in case of shafts, wells, cesspits, manholes and the like including strutting, shoring and packing cavities (wherever required) etc. complete (Measurements to be taken of the face area timbered).Depth exceeding 1.5 m but not exceeding 3 m						
	Close Timbering for Type-II Manhole						
	60 % number of MH needed	103.2			2.800	6.912000	1997.292
	Total						**1997.292**
						Total Quantity in sqm	**1997.292**
2.025	2.17.3						
	Close timbering in case of shafts, wells, cesspits, manholes and the like including strutting, shoring and packing cavities (wherever required) etc. complete (Measurements to be taken of the face area timbered).Depth exceeding 3 m but not exceeding 4.5 m						
	Close Timbering for Type-III Manhole						
	60% number of MH needed	199.8			4.500	9.425000	8474.018
	Total						**8474.018**
						Total Quantity in sqm	**8474.018**
2.026	100.6.1						
	Providing steel sheet shoring to the sides of the trenches to depths of above 4.00 m but not exceeding 6.00m using 6 mm M.S. sheet 0.50 M wide stiffen on edges with 50 mm x 50mm x 6 mm M.S. angles driving down vertically on either side one after another in lines and levels with suitable pile driving equipments and accessories to a maximum depth of 0.50 M below the bottom of the proposed excavation 0.5 M above ground level suitably braced by horizontal walling pieces at 75 x 150 mm x 8 mm angles on either side at intervals not exceeding 1.50M and horizontal screw jack type struts at 1.50M intervals and maintaining the shoring till the pipes are laid and works are completed, dismantling, cleaning and restacking for reuse including all labour, hire charges and conveyance for equipments, tools and plants and sundries etc. complete.						
	Steel sheet shoring for Type-III Manhole						
	MH up to 6m	75			6.500	9.425000	4594.688
	MH up to 7.5m	18			8.000	9.425000	1357.200
	MH up to 7.75m	5			8.250	9.425000	388.781
	Total						**6340.669**
						Total Quantity in sqm	**6340.669**
2.027	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	PCC for Manholes						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Type-I	433			0.200	1.327000	114.918
	Type-II	172			0.200	2.011000	69.178
	Type-III	333			0.200	3.142000	209.257
	Total						**393.353**
						Total Quantity in cum	**393.353**
2.028	5.1.2						
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size						
	Deduct MH Cover Volume						
	Type-I	-374	0.600	0.600	0.200		-26.928
	Total						**-26.928**
	RCC for Type-I Manholes up to 1.5m						
	Type-I- Side Wall Up to 1.5 m	374	1.100	0.200	1.300	3.141500	336.027
	Type-I- Bottom concrete	374	0.650	0.650	0.300	3.141500	148.921
	Type-I- Cover Slab	374	0.650	0.650	0.200	3.141500	99.281
	Total						**584.229**
						Total Quantity in cum	**557.301**
2.029	5.2.2						
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)						
	RCC for Type-I,II & III Manholes						
	Type-I - side wall	59	1.200	0.200	1.450	3.140000	64.470
	Type-II - side wall	172	1.400	0.200	2.100	3.142000	317.769
	Type-III - side wall	98	1.750	0.250	2.800	3.142000	377.197
	Type-III - side wall	137	1.750	0.250	4.300	3.142000	809.792
	Type-III - side wall	75	1.750	0.250	5.800	3.142000	597.962

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Type-III - side wall	23	1.750	0.250	7.500	3.142000	237.123
	Type-I - bottom concrete	59	(1.3*1.3)/4		0.300	3.140000	23.482
	Type-II - bottom concrete	172	(1.6*1.6)/4		0.300	3.142000	103.761
	Type-III - bottom concrete	333	(2*2)/4		0.300	3.142000	313.886
	Type-I - cover slab	59	(1.3*1.3)/4		0.200	3.142000	15.664
	Type-II - cover slab	172	(1.6*1.6)/4		0.200	3.142000	69.174
	Type-III - cover slab	333	(2*2)/4		0.200	3.142000	209.257
	Total						**3139.537**
	Deduct MH Cover Volume						
		-564	0.600	0.600	0.200		-40.608
	Total						**-40.608**
						Total Quantity in cum	**3098.929**
2.030	5.9.2						
	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.						
	Formwork for manholes						
	Type-I -outside	433			1.650	4.084000	2917.814
	Type-I -inside	433			1.450	2.827000	1774.932
	Type-II -outside	172			2.300	5.026000	1988.286
	Type-II -inside	172			2.100	3.769000	1361.363
	Type-III -outside	333			(2.3+7.75)/2	6.283000	10513.501
	Type-III -inside	333			(2.3+7.75)/2	4.712000	7884.707
	Total						**26440.603**
						Total Quantity in sqm	**26440.603**
2.031	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Formwork for cover slab of Manholes						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Type-I	433				0.636000	275.388
	Type-II	172				1.131000	194.532
	Type-III	333				1.767000	588.411
	Total						**1058.331**
						Total Quantity in sqm	**1058.331**
2.032	5.22.6						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - Mechanically Treated bars of grade Fe-500D or more						
	Steel reinforcement for RCC works						
	Vide Qty of item 28 & 29 @ 100kg/m3	3656.23				100.000000	365623.000
	Total						**365623.000**
						Total Quantity in kilogram	**365623.000**
2.033	13.7.1						
	12 mm cement plaster finished with a floating coat of neat cement of mix:1:3 (1 cement : 3 fine sand)						
	Plastering of Manholes						
	Type-I inside wall	433			1.450	2.827000	1774.932
	Type-II inside wall	172			2.100	3.769000	1361.363
	Type-III inside wall	333			4.700	4.712000	7374.751
	Type-I bottom	433				0.636000	275.388
	Type-II bottom	172				1.131000	194.532
	Type-III bottom	333				1.767000	588.411
	Total						**11569.377**
						Total Quantity in sqm	**11569.377**
2.034	2.25						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m.						
	Filling Earth						
	Type-I	433				3.016000	1305.928
	Type-II	172				4.745000	816.140
	Type-III	333				18.958000	6313.014
	Total						**8435.082**
						Total Quantity in cum	**8435.082**
2.035	19.16						
	Providing orange colour safety foot rest of minimum 6 mm thick plastic encapsulated as per IS: 10910 on 12 mm dia steeel bar conforming to IS:1786, having minimum cross section as 23 mm x 25 mm and over all minimum length 263 mm and width as 165 mm with minimum 112 mm space between protruded legs having 2 mm tread on top surface by ribbing or chequering besides necessary and adequate anchoring projections on tail length on 138 mm as per standard drawing and suitable to with stand the bend test and chemical resistance test as per specifications and having manufactures permanent identification mark to be visible even after fixing including fixing in manholes with 30x20x15 cm cement concrete block 1:3:6 (1cement: 3 coarse sand: 6 graded stone aggregate 20 mm nominal size) Complete as per design						
	Foot rest for Manhols						
	Type-I	433				6.000000	2598.000
	Type-II	172				8.000000	1376.000
	Type-III	333				24.000000	7992.000
	Total						**11966.000**
						Total Quantity in each	**11966.000**
3	Supply of Pipes and Specials						
3.001	OD150068/2022-2023						
	Supply of HDPE Pipe PE 100 PN-8(IS-14333), 8kg, 225mm Outer Dia.						
	225mm OD HDPE pipe						
	19810m + 2% for maintenance	20206					20206.000
	Total						**20206.000**
						Total Quantity in metre	**20206.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
3.002	OD150069/2022-2023						
	Supply of HDPE Pipe PE 100 PN-8(IS-14333), 8kg, 280mm Outer Dia.						
	280mm OD HDPE pipe						
	366m + 2% for maintenance	374					374.000
	Total						**374.000**
						Total Quantity in metre	**374.000**
3.003	OD150070/2022-2023						
	Supply of HDPE Pipe PE 100 PN-8(IS-14333), 8kg, 355mm Outer Dia.						
	355mm OD HDPE pipe						
	1040m + 2% for maintenance	1061					1061.000
	Total						**1061.000**
						Total Quantity in metre	**1061.000**
3.004	OD150071/2022-2023						
	Supply of HDPE Pipe PE 100 PN-8(IS-14333), 8kg, 450mm Outer Dia.						
	450mm OD HDPE pipe						
	491m + 2% for maintenance	501					501.000
	Total						**501.000**
						Total Quantity in metre	**501.000**
3.005	OD150072/2022-2023						
	Supply of HDPE Pipe PE 100 PN-8(IS-14333), 8kg, 560mm Outer Dia.						
	560mm OD HDPE pipe						
	681 m + 2% for maintenance	695					695.000
	Total						**695.000**
						Total Quantity in metre	**695.000**
4	Road Restoration Charges						
4.001	OD150079/2022-2023						
	Road Restoration Charges- BM & BC Road						
	BM & BC Road						
	NH road	1	2150.000	1.000			2150.000
	PWD roads	1	1508.000	1.000			1508.000
	Total						**3658.000**
	Entry pit and Exit pit for HDD method in various roads of Cluster-I						
		1				400.000000	400.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**400.000**
						Total Quantity in sqm	**4058.000**
4.002	OD150080/2022-2023						
	Road Restoration Charges- Municipal Corporation Road						
	Tar cutting for Manhole construction						
	Type-I	433				2.835000	1227.555
	Type-II	172				3.801000	653.772
	Type-III	333				7.069000	2353.977
	Total						**4235.304**
	Corporation Tar cutting						
		1	10000.000	1.000			10000.000
	Total						**10000.000**
						Total Quantity in sqm	**14235.304**
4.003	OD150081/2022-2023						
	Road Restoration Charges- Concrete road surface						
	concrete road cutting						
		1	7990.000	1.000			7990.000
	Total						**7990.000**
						Total Quantity in sqm	**7990.000**
4.004	OD150082/2022-2023						
	Road Restoration Charges- Berm Cutting						
	Earth/Mud road cutting						
		1	740.000	1.000			740.000
	Total						**740.000**
						Total Quantity in sqm	**740.000**

DETAILED ESTIMATE

Others-Sewerage Network design- Kureeppuzha west and Vallikkeezhu wards to be connected to 12 MLD STP at Kureeppuzha-Providing House service connections,SCADA & Automation,Installation of Pump Sets,Installation of Solar Power Plant,DG sets etc and allied works-Sewerage Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	Service Connection to Houses and Buildings						
1.001	100.59.1						
	Cutting the bituminous / concrete roads with cutting machine for a minimum depth of 200mm along the sides of proposed alignment of the pipe to be laid without causing any damage to other utilities, including the charges for hire and conveyance of tools and plant, cost of consumables and charges for lighting, watching, ribbon fencing, caution boards, traffic diversion, and as per the direction of departmental officers etc. complete, before carrying out the demolition of bituminous / concrete road by mechanical means and carrying out the excavation.						
	Houses- 3113 nos and Commercial Institutions-49						
	Average 5m length is taken for each House sewer connection and average 15m taken for Commercial connection	3113	5.000				15565.000
	Average 15m taken for Commercial connection	49	15.000				735.000
	Total						**16300.000**
	Total Quantity in metre						**16300.000**
1.002	15.59						
	Dismantling of flexible pavement (bituminous courses) by mechanical means and disposal of dismantled material up to a lead of 1 kilo metre, as per direction of Engineer-in-charge.						
	Dismantling of flexible pavement for connection						
	50 % length is to dismantling taken (vide item No-1)	3162	5.000	0.300	0.100	0.500000	237.150
	Total						**237.150**
	Total Quantity in cum						**237.150**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1.003	100.1.1						
	Excavating trenches of required width for pipes, cables, etc., including excavation for sockets, and dressing of sides, ramming of bottoms, depth up to 1.5m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating each deposited layer by ramming, watering, etc., and disposing of surplus excavated soil as directed, within a lead of 50m, in all kinds of soil.						
	Excavation trenches						
	Average 5m length is taken as for each sewer connection	3113	5.000	0.300	0.500		2334.750
	Average 15m length is taken as for each sewer connection	49	15.000	0.300	0.500		110.250
	Total						**2445.000**
						Total Quantity in cum	**2445.000**
1.004	100.9.9						
	Laying uPVC pipes of class 2 to class 6 and specials, lowering to the trenches already made, placing in position aligning the pipeline to the lines and levels and jointing the pipes and specials with solvent cement and testing the pipeline with water to the required test pressure (excluding cost of pipes and specials): 110 mm nominal outside diameter pipes.						
	Laying 110 PVC pipes						
	Average 5m length is taken as for each sewer connection	3113	5.000				15565.000
	Total						**15565.000**
						Total Quantity in metre	**15565.000**
1.005	100.98.224						
	Supply of PVC Pipe, 8kg/cm2, 110mm Dia.						
	110mm PVC pipe						
	14260 m + 2% for maintamnance	14546					14546.000
	Total						**14546.000**
						Total Quantity in metre	**14546.000**
1.006	100.9.11						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Laying uPVC pipes of class 2 to class 6 and specials, lowering to the trenches already made, placing in position aligning the pipeline to the lines and levels and jointing the pipes and specials with solvent cement and testing the pipeline with water to the required test pressure (excluding cost of pipes and specials): 160 mm nominal outside diameter pipes.						
	Laying 160mm PVC pipe for Commercial connection- 23 nos						
	Average 15m length is taken as for each sewer connection	49	15.000				735.000
	Total						**735.000**
						Total Quantity in metre	**735.000**
1.007	100.98.226						
	Supply of PVC Pipe, 8kg/cm2, 160mm Dia.						
	Supply of pipe						
	735 m + 2% for maintamnance	750					750.000
	Total						**750.000**
						Total Quantity in metre	**750.000**
1.008	2.27						
	Supplying and filling in plinth with Jamuna sand under floors, including watering, ramming consolidating and dressing complete.						
	supply						
	50% of total length is taken vide qty - 4+6	1	13980+345	0.300	0.200	0.500000	429.750
	Total						**429.750**
						Total Quantity in cum	**429.750**
1.009	4.1.5						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	Restoring the excavated portions						
	50 % length is taken into restoration vide qty- 4+6	1	13980+345	0.300	0.100	0.500000	214.875
	Total						**214.875**
						Total Quantity in cum	**214.875**
2	Connection Chamber for Houses and Buildings						
2.001	2.6.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	Total number of households and Commercial institutions- (2796+23)						
	Type-1 Chamber 50% of 3162	1410	0.550	0.550	0.900		383.873
	Type-2 Chamber 300% of 3162	949	0.600	0.550	0.750		234.878
	Type-3 Chamber 20% of 3162	632	1.200	0.600	0.900		409.536
	Total						**1028.287**
						Total Quantity in cum	**1028.287**
2.002	19.28.1						
	Constructing brick masonry road gully chamber 45x45x77.5 cm with bricks in cement mortar 1:4 (1 cement:4 coarse sand) with pre -cast R.C.C vertical grating complete as per standard design:With common burnt clay F.P.S (non modular) bricks of class designation 7.5						
	Constructing brick masonry Gully chamber						
	Type-I Gully Chamber	1581					1581.000
	Total						**1581.000**
						Total Quantity in each	**1581.000**
2.003	19.27.1						
	Constructing brick masonry road gully chamber 50x45x60 cm with bricks in cement mortar 1:4 (1 cement: 4 coarse sand) including 500x450 mm pre- cast R.C.C. horizontal grating with frame complete as per standard design:With common burnt clay F.P.S(non modular) bricks of class designation 7.5						
	Constructing brick masonry Gully chamber						
	Type-II Gully Chamber	949					949.000
	Total						**949.000**
						Total Quantity in each	**949.000**
2.004	19.29.1						
	Constructing brick masonry road gully chamber 110x50x77.5 cm with bricks in cement mortar 1:4 (1 cement: 4 coarse sand) including 500x450 mm pre-cast R.C.c horizontal grating with frame and vertical grating complete as per standard design:With common burnt clay F.P.S (non modular) bricks of class designation 7.5						
	Constructing brick masonry Gully chamber						
	Type-III Gully Chamber	632					632.000
	Total						**632.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in each	**632.000**
2.005	19.4.1.1						
	Providing and fixing square-mouth S.W. gully trap class SP -1 complete with C.I. grating brick masonry chamber with water tight C.I. cover with frame of 300x300 mm size (inside) the weight of cover to be not less than 4.50 kg and frame to be not less than 2.70 kg as per standard design: 100x100 mm size P typeWith common burnt clay F.P.S. (non modular) bricks of class designation 7.5						
	Providing and fixing square-mouth Gully Trap						
	60 % of Type-I (1410x60%)	1580				0.600000	948.000
	Total						**948.000**
						Total Quantity in each	**948.000**
2.006	19.4.1.2						
	Providing and fixing square-mouth S.W. gully trap class SP -1 complete with C.I. grating brick masonry chamber with water tight C.I. cover with frame of 300x300 mm size (inside) the weight of cover to be not less than 4.50 kg and frame to be not less than 2.70 kg as per standard design: 100x100 mm size P typeWith Sewer bricks conforming to IS: 4885						
	Providing and fixing square-mouth Gully Trap						
	60 % of Type-II (846x60%)=508	966					966.000
	Total						**966.000**
						Total Quantity in each	**966.000**
2.007	19.4.3.2						
	Providing and fixing square-mouth S.W. gully trap class SP -1 complete with C.I. grating brick masonry chamber with water tight C.I. cover with frame of 300x300 mm size (inside) the weight of cover to be not less than 4.50 kg and frame to be not less than 2.70 kg as per standard design: 180x150 mm size P typeWith sewer bricks conforming to IS: 4885						
	Providing and fixing square-mouth Gully Trap						
	60 % of Type-III (563x60%)=338	381					381.000
	Total						**381.000**
						Total Quantity in each	**381.000**
3	SCADA & Automation at Well site						
3.001	OD153349/2022-2023						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	SCADA-Design, manufacture, supply, installation, testing and commissioning of indoor type PLC panel of size approx. 1100 mm X 800 mm X 2100mm (LBH) , fabricated out of min. 2 mm thick CRCA sheet complete with Operator Station (PC) including, necessary programming software for PLC & SCADA and comprising of all required accessories not limited to the following: Programmable Logic Controller (PLC) with Dual redundant CPU, Power supply module for IO & Processor rack (Standard DC), Back up Interface/Expansion Module(BCM/BEM), Rack (Backplane) 10 slots for IO and Processor – 1 lot DI - 1184 num DO – 720 num AI –112 num AO – 32 num Ethernet Switch- 6 num MCB 10A DP – 6 num MCB 4A DP – 4 num MCBSP2A – 20 num MCB 1A DP – 30 num 24 VDC Power Supply 10A – 2 num Push Buttons – 100 num Selector Switch – 50 num Control Relays – 550 num Annunciator with 24 Windows NO to NC Type Microprocessor Based, Window Size 75*42mm, 110VAC, with Electronic Hooter – 1 num Control Transformer - 4 num Emergency PB – 4 num Panel Cooling Fan – 4 num Panel Light with Door Switch – 4 num Control Indication Lamp – 50 num Wiring + TB etc – 1 lot Hardware – 1 lot HMI – 6 num Operator Station including, Core i5 processor, 8 GB DDR-3 RAM, 500 GB HDD, DVD RW Drive, RS-						
	SCADA Installation in Proposed Pump Houses						
	Proposed Well at existing STP premises Muttathara	1					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
4	Installation of Pump Sets for Well						
4.001	OD153355/2022-2023						
	Providing & installation of Electrical Sludge Pump with complete assembly and suitable control panel including connection cable of 30 Mtrs EPR with H Class Insulation. Tandem TC/TC and TC/TC Mechanical Seals. C.I Channel Impeller.SS Shaft and hardware. 4" Hose/Flange Outlet. 10HP, 3PH, 50HZ, 415V, 1450 Rpm						
	Non Clog Submersible Pump set at Well						
	Proposed Well	2				10.000 000	20.000
	Proposed Well	2				20.000 000	40.000
	Total						**60.000**
						Total Quantity in HP (Horse power)	**60.000**
4.002	100.31.2.2						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Conveying and fixing C.I. sluice valves (with cap) by providing bolts, nuts, rubber insertions etc., complete, but excluding the cost of the valve (tail pieces, if required, will be paid separately): 100mm diameter, Class II.						
	Conveying and fixing C.I 100mm sluice valve						
		2					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
4.003	100.98.429						
	Supply of CI Non Return Valve, Conforming to IS 5312 Part I - 1984, PN 1.6, Size 100mm.						
	Supply of CI Non Return Valve,						
		2					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
5	Solar Power Plant at Well site						
5.001	OD153356/2022-2023						
	Supplying, installing, testing and commissioning of 1-100 kWp capacity on grid solar power pack with GI mounting structure and inter connecting wires / cables without battery bank SPV modules and solar power conditioning unit of required capacity complete, with 5 years on site performance warrantee. Specification no. ESD-RTONG						
	Supplying, installing, testing of Solar power pack						
	Proposed Well STP-100 kWp	1				100.000000	100.000
	Total						**100.000**
						Total Quantity in Kwh	**100.000**
6	Diesel Generator Set for Well sites						
6.001	OD153353/2022-2023						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	SITC of DG Set complete with 1500 RPM Diesel Engine of suitable BHP & AC Brush less SPDP Alternator mounted on a common base Frame & coupled through a flexible coupling or close coupled.Alternator shall be self regulated with standard Alternator Protection(Over voltage, over speed & under voltage). Engine shall have residential silencer, up to 10 M exhaust piping , electronic / Mechanical governor, Manual & electric Start, Batteries, Fuel tank (with Stand) & piping, control panel (16 G) with MCCB (4P; 25 KA), Ammeter, Voltmeter, Frequency Meter, Energy Meter & Hour Meter, Engine instruments panel, AVM and with Weatherproof, powder coated Acoustic enclosure for DG set for sound attenuation fabricated from 1.6 mm CRCA sheet steel (structure) with side wall fabricated from 1.6 mm CRCA sheet and filled with foam as per CPCB norms latest amendments & IS 8183 .The doors are fabricated from 1.6 mm CRCA sheet packed with acoustic material, floor of MS chequered plate 5.0 mmthick, All doors/ opening are sealed with neoprene/ EPDN gaskets. The enclosure has built in fuel tank, residential silencer (isolated from main DG chamber) with protection and tripping of DG set against temperature of more than 50 °C. All controls for operation of DG set re from outside the enclosure with DG control panel having microprocessor based genset monitoring nd control system mccb Ammeter, voltmeter, Pf meter, frequency meter, KWH meter, Ind. Lamps etc. mounted inside enclosure, visible and accessible from outside. The enclosure should be suitable for following capacity DG sets and alternator. Noise level is less than 75 db (A) at a distance of 1 Mtrs. duly certified by authorized agency. Complete in all respect of following capacity : (Radiator cooled and turbo charged) 						
	SITC of DG						
	For well site	1					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
6.002	OD153354/2022-2023						
	SITC of AUTO MAINS FAILURE (AMF) Panel fabricated from CRCA sheet steel 2mmThick , Powder coated finish , Engine START & STOP commands, control RELAYS, selector switches for Ammeter & Voltmeter, Ammeter & Voltmeter , Control & Power Contactors, Timers, Electronic Hooter ,Visual & Alarm indication for faults, UPS, operator interface panel complete in all respect suitable for following capacity DG sets (PLC Based) 180 to 250 KVA						
	SITC of AUTO MAINS FAILURE (A						
	For well site	1					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
7	Power Line Extension,Supply,Erection and commissioning of Transformers and all Accessories in Well site						
7.001	OD153350/2022-2023						
	1 11 KV line on 152 X 152 mm,37.1 Kg/Mtr. 13 Mtr. Long H-Beam with Dog conductor average span of 50 mtr DCDS (For Lift Manholes)						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Power line						
		1					1.000
	Total						**1.000**
						Total Quantity in km	**1.000**
7.002	OD158126/2022-2023						
	Power Line Extension,Supply,Erection and commissioning of Transformers and all Accessories in Well site						
	Power Line Extension,Supply,Erection and commissioning of Transformers and all Accessories in Well site						
		1					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**
8	Drop Arrangement						
8.001	OD153351/2022-2023						
	Drop Arrangement Providing and fixing PVC-U pipes as per IS 15328 drop connection externally for depth from 0.60 m and upto 1.0 m drop from branch sewer line to main sewer manhole or vise versa including inspection and cleaning eye, PVC-U drop pipe and bend encased around with cement concrete M15 with all form work, cutting holes in walls and making good with brick/ stone masonry work in cement sand mortar 1:4 plastered with cement sand mortar 1:3 with stiff cement mortar 1:1 around PVC-U pipe in masonry wall, making required channels complete as per standard design and specifications and/ or as the directed by the Engineer:						
	Drop Arrangement						
		100					100.000
	Total						**100.000**
						Total Quantity in no	**100.000**
8.002	OD153352/2022-2023						
	Providing and fixing PVC-U pipes as per IS 15328 drop connection externally for depth from 0.60 m and upto 1.0 m drop from branch sewer line to main sewer manhole or vise versa including inspection and cleaning eye, PVC-U drop pipe and bend encased around with cement concrete M15 with all form work, cutting holes in walls and making good with brick/ stone masonry work in cement sand mortar 1:4 plastered with cement sand mortar 1:3 with stiff cement mortar 1:1 around PVC-U pipe in masonry wall, making required channels complete as per standard design and specifications and/ or as the directed by the Engineer: Extra for additional drop depth of PVC-U pipes as per IS 15328 drop connection beyond 1.0 m complete as per standard specification and the direction of the Engineer. 200mm dia/250mm dia/315mm dia						
	Providing and fixing PVC-U pipes						
		1	1.000	150.000			150.000
	Total						**150.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in metre	**150.000**
9	Soil investigation						
9.001	OD158132/2022-2023						
	Soil investigation charges						
	Soil investigation charges						
		1					1.000
	Total						**1.000**
						Total Quantity in each	**1.000**

DRAFT
ePRICE
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

DETAILED ESTIMATE

Others-Sewerage Network design- Kureeppuzha west and Vallikkeezhu wards to be connected to 12 MLD STP at Kureeppuzha-Supplying,Laying,Testing and Commissioning of 200mm DI K9 Sewer Pumping main from collection well to 12 MLD STP at Kureeppuzha-Sewerage Work

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
1	supplying layingTesting and commissioning of 200mm DI K9 Sewer Pumping main from MPS to STP -working charges						
1.001	100.59.1						
	Cutting the bituminous / concrete roads with cutting machine for a minimum depth of 200mm along the sides of proposed alignment of the pipe to be laid without causing any damage to other utilities, including the charges for hire and conveyance of tools and plant, cost of consumables and charges for lighting, watching, ribbon fencing, caution boards, traffic diversion, and as per the direction of departmental officers etc. complete, before carrying out the demolition of bituminous / concrete road by mechanical means and carrying out the excavation.						
	Cutting the bituminous / concrete						
	From PS to STP	2	20.000				40.000
	Total						**40.000**
						Total Quantity in metre	**40.000**
1.002	15.59						
	Dismantling of flexible pavement (bituminous courses) by mechanical means and disposal of dismantled material up to a lead of 1 kilo metre, as per direction of Engineer-in-charge.						
	Dismantling of flexible pavement						
	From PS to STP	1	20.000	1.000	0.150		3.000
	Total						**3.000**
						Total Quantity in cum	**3.000**
1.003	15.3						
	Demolishing R.C.C. work manually / by mechanical means including stacking of steel bars and disposal of unserviceable material with in 50 metres lead as per direction of Engineer -in-Charge.						
	Demolishing RCC						
		1	0.750				0.750
	Total						**0.750**
						Total Quantity in cum	**0.750**
1.004	100.1.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Excavating trenches of required width for pipes, cables, etc., including excavation for sockets, and dressing of sides, ramming of bottoms, depth up to 1.5m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating each deposited layer by ramming, watering, etc., and disposing of surplus excavated soil as directed, within a lead of 50m, in all kinds of soil.						
	Excavating trenches of required						
	300mm pipe	1	75.000	0.700	1.200	0.980000	61.740
	Total						**61.740**
						Total Quantity in cum	**61.740**
1.005	100.1.5						
	Excavating trenches of required width for pipes, cables, etc., including excavation for sockets, and dressing of sides, ramming of bottoms, depth up to 1.5m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating each deposited layer by ramming, watering, etc., and disposing of surplus excavated soil as directed, within a lead of 50 m, in Ordinary Rock.						
	Excavating trenches						
	300mm pipe	1	75.000	0.700	1.200	0.030000	1.890
	Total						**1.890**
						Total Quantity in cum	**1.890**
1.006	100.1.13						
	Excavating trenches of required width for pipes, cables, etc., including excavation for sockets, and dressing of sides, ramming of bottoms, depth up to 1.5m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20cm in depth, including consolidating each deposited layer by ramming, watering, etc., and disposing of surplus excavated soil as directed, within a lead of 50m, in Hard Rock where Blasting is Prohibited.						
	Earth work						
	300mm pipe	1	75.000	0.700	1.200	0.020000	1.260
	Total						**1.260**
						Total Quantity in cum	**1.260**
1.007	100.8.2						
	Fencing 1.50m high with two rows of casuarina poles (girth 15cm to 24cm) tied with coir yarn on vertical casuarina pole (girth 15cm to 24cm) fixed at 1.5m intervals.						
	Fencing 1.50m high with two rows						
		1	75.000				75.000
	Total						**75.000**
						Total Quantity in metre	**75.000**
1.008	2.20.2						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Open timbering in trenches including strutting and shoring complete (measurements to be taken of the face area timbered):Depth exceeding 1.5 m but not exceeding 3 m						
	Open timbering in trenches i						
		2	50.000			0.250000	25.000
	Total						**25.000**
						Total Quantity in sqm	**25.000**
1.009	100.14.3						
	Conveying and laying S&S Centrifugally Cast (Spun) / Ductile Iron Pipes conforming to IS: 8329 excluding cost of pipes and specials: 200mm diameter Ductile Iron Class K-9 Pipes.						
	200 mm DI						
		1	75.000				75.000
	Total						**75.000**
						Total Quantity in metre	**75.000**
1.010	18.70.3						
	Providing push - on-joints to Centrifugally (Spun) Cast Iron Pipes or Ductile Iron Pipes including testing of joints and including the cost of rubber gasket:200 mm dia pipes						
	Push- on - joints						
		1	17.000				17.000
	Total						**17.000**
						Total Quantity in joint	**17.000**
1.011	18.83.5						
	Labour for cutting C.I. pipe with steel saw.200 mm diameter C.I. pipe						
	Cutting 200mm DI pipes						
		1	6.000				6.000
	Total						**6.000**
						Total Quantity in Each Cut	**6.000**
1.012	100.35.3						
	Testing 200mm DI/CI pipeline with potable water to the required test pressure 200 mm dia Observed Data derived from item no.1020 of PHED DATA						
	Testing 200 DI pipe						
		1	75.000				75.000
	Total						**75.000**
						Total Quantity in metre	**75.000**
1.013	18.24						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Laying in position S & S or flanged C.I. special such as tees, bends, collars, tapers and caps etc. (excluding cost of specials).						
	Laying in position S & S						
	200 mm DI Flanged Spigot Tail piece (long)	1				0.230000	0.230
	200 mm DI Fkanged Socket Tail piece (long)	1				0.210000	0.210
	200 mm Mechanical joint Collar-1no.+1no. for maintainance	2				0.250000	0.500
	200 mm *200mm*80mm DI All Flanged Tee	2				0.220000	0.440
	200 mm Duckfoot Bend flanged	1				0.450000	0.450
	200 mm D/F Bend 90 degree	2				0.310000	0.620
	200 mm Bend 45 degree	1				0.260000	0.260
	200 mm Bend 22.5 degree	1				0.310000	0.310
	200 mm Bend 11.25 degree	1				0.280000	0.280
	Total						**3.300**
						Total Quantity in quintal	**3.300**
1.014	100.32.4						
	Conveying and fixing C. I. Double Acting Air Valve of approved quality with bolts, nuts, rubber insertions etc., complete, but excluding the cost of air valve (tail pieces, if required, will be paid separately): 80mm Double Acting Air Valve.						
	Conveying and fixing C. I. Double Acting Air Valve of approved						
		1					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.015	100.31.2.1						
	Conveying and fixing C.I. sluice valves (with cap) by providing bolts, nuts, rubber insertions etc., complete, but excluding the cost of the valve (tail pieces, if required, will be paid separately): 80mm diameter, Class II.						
	80mm CI sluice valve						
		1					1.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**1.000**
						Total Quantity in no	**1.000**
1.016	100.31.2.7						
	Conveying and fixing C.I. sluice valves (with cap) by providing bolts, nuts, rubber insertions etc., complete, but excluding the cost of the valve (tail pieces, if required, will be paid separately): 300mm diameter, Class II.						
	300mm CI Sluice valve						
		1					1.000
	Total						**1.000**
						Total Quantity in no	**1.000**
1.017	100.31.2.5						
	Conveying and fixing C.I. sluice valves (with cap) by providing bolts, nuts, rubber insertions etc., complete, but excluding the cost of the valve (tail pieces, if required, will be paid separately): 200mm diameter, Class II.						
	200 mm D/F SLV and 200 mm D/F NRV						
	200 mm SLV	1					1.000
	200 mm NRV	1					1.000
	Total						**2.000**
						Total Quantity in no	**2.000**
1.018	18.73.3						
	Providing and laying Double Flanged (Screwed / Welded) Centrifugally (Spun) Ductile Iron Pipes of Class K - 9 conforming to IS: 8329 :200 mm dia Ductile Iron Double Flanged						
	Laying 200mm pipe D/F pipe						
		1	12.000				12.000
	Total						**12.000**
						Total Quantity in metre	**12.000**
2	construction of Valve Chamber , Anchor Blocks, Culvert Crossing and Miscellanious aworks						
2.001	2.6.1						
	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil						
	Earth work in excavation						
	E/W for 80mm air valve,200 mm SLV & 200 mm NRV	3	1.600	1.600	1.500		11.520
	Anchor blocks and Thrust blocks	5	1.000	0.800	1.500		6.000

DRAFT
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**17.520**
						Total Quantity in cum	**17.520**
2.002	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	Providing and laying in position cement concrete						
	PCC for 80mm air valve	3	1.600	1.600	0.100		0.768
	PCC for Anchor blocks and Thrust blocks	5	1.000	0.800	0.100		0.400
	PCC for footing	2	1.500	1.500	0.100		0.450
	Total						**1.618**
						Total Quantity in cum	**1.618**
2.003	4.1.5						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)						
	Providing and laying in position cement concrete						
	Road restoration	1	20.000	1.000	0.150		3.000
	Total						**3.000**
						Total Quantity in cum	**3.000**
2.004	5.1.2						
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size						
	Providing and laying in position specified grade						
	Valve chamber - Side wall	3	5.600	0.200	1.050		3.528
	Valve chamber - bottom concrete	3	1.600	1.600	0.150		1.152
	Valve chamber - cover slab	3	1.600	1.600	0.200		1.536
	Anchor blocks & Thrust blocks	5	1.000	0.800	0.800		3.200
	Pipe suppoort - Footing	2	1.500	1.500	0.600		2.700
	Pipe suppoort - column	2	0.350	0.350	2.500		0.613

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Pipe suppoort - Beam	1	10.000	0.250	0.450		1.125
	Pipe suppoort - slab	1	10.000	1.000	0.150		1.500
	Deduct MH cover	-3	0.600	0.600	0.200		-0.216
	Total						**15.138**
						Total Quantity in cum	**15.138**
2.005	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	Centering and shuttering including strutting						
	Anchor blocks & Thrust blocks	5	3.600		0.800		14.400
	Footing	2	6.000		0.300		3.600
	Total						**18.000**
						Total Quantity in sqm	**18.000**
2.006	5.9.2						
	Centering and shuttering including strutting, etc. and removal of form for:Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.						
	Centering and shuttering including strutting						
	Valve chamber side wall outside	3	6.400		1.050		20.160
	Valve chamber side wall inside	3	4.800		1.050		15.120
	Total						**35.280**
						Total Quantity in sqm	**35.280**
2.007	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	Centering and shuttering including strutting,						
	column	2	1.400		1.900		5.320
	Total						**5.320**
						Total Quantity in sqm	**5.320**
2.008	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	Centering and shuttering including strutting,						
	Beam	1	10.000	0.850			8.500
	Cover slab	1	1.600	1.600			2.560
	Total						**11.060**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in sqm	**11.060**
2.009	5.22A.6						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete above plinth level.Thermo - Mechanically Treated bars of grade Fe-500D or more						
	Steel reinforcement for R.C.C work including						
	Valve chamber-150kg/each	3				150.000000	450.000
	Anchor blocks-65kg/each	5				65.000000	325.000
	Ppipe support - 90kg/cu.m	5.938				90.000000	534.420
	Total						**1309.420**
						Total Quantity in kg	**1309.420**
2.010	15.9.2						
	Demolishing stone rubble masonry manually / by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer -in- Charges:In cement mortar						
	Demolishing stone rubble masonry manually						
		1				2.000000	2.000
	Total						**2.000**
						Total Quantity in cum	**2.000**
2.011	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	Random rubble masonry with hard stone in foundation						
		1				3.000000	3.000
	Total						**3.000**
						Total Quantity in cum	**3.000**
2.012	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	12 mm cement plaster of mix:						
	Valve chamber - Side wall inside	3	4.800		1.050		15.120
	Valve chamber - bottom plastering	3	1.600	1.600			7.680
	Pipe support-Slab top	3	10.000	1.000			30.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**52.800**
						Total Quantity in sqm	**52.800**
2.013	100.41.39						
	Supply, stacking, spreading and consolidating of Quarry Muck in the trench of pipe line, including carriage, loading, unloading & stacking up to any lead.						
	Supply, stacking, spreading and consolidating of Quarry						
		1	25.000	1.000	0.300		7.500
	Total						**7.500**
						Total Quantity in cum	**7.500**
2.014	OD152686/2022-2023						
	Conveying MH cover 560x560mm with frame and fixing to line and levels including all necessary chipping and masonry work etc complete						
	Conveying MH cover 560x560mm with frame and fixing to line and levels including all necessary chipping and masonry work etc complete no@ 565.64 /no?0.00						
		3					3.000
	Total						**3.000**
						Total Quantity in no	**3.000**
3	Cost of Pipes and amp; Specials (cost Index :35.59%)						
3.001	100.98.117						
	Supply of DI K9 Pipe Conforming to IS 8329/2000, 200mm Dia.						
	200 mm DI Pipe supply						
	2% maintenance	1	75+2				77.000
	Total						**77.000**
						Total Quantity in metre	**77.000**
3.002	100.98.432						
	Supply of CI Non Return Valve, Conforming to IS 5312 Part I - 1984, PN 1.0, Size 200mm.						
	200 mm D/F NRV						
	1 No for maintenance	2					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
3.003	OD152683/2022-2023						
	560 mm dia cover with frame (Heavy duty)						
	560 mm dia cover with frame (Heavy duty)						
		4					4.000
	Total						**4.000**
						Total Quantity in each	**4.000**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
3.004	100.98.454						
	Supply of CI Air Valve with Flanges, Conforming to IS 14845 - 2000, Kinetic Air Valve Type DS2, Size 80mm.						
	Supply of CI Air Valve with Flanges, Conforming to IS 14845 - 2000, Kinetic Air Valve Type DS2, Size 80mm.						
		2					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
3.005	100.98.457						
	Supply of CI Double Flanged Sluice Valve Conforming to IS 14846 - 2000, Sluice Valve with Cap PN 1.6, Size 80mm.						
	Supply of CI Double Flanged Sluice Valve Conforming to IS 14846 - 2000, Sluice Valve with Cap PN 1.6, Size 80mm.						
		2					2.000
	Total						**2.000**
						Total Quantity in no	**2.000**
3.006	OD152684/2022-2023						
	Ductile Iron specials suitable for mechanical jointing as per I.S.9523 - up to 600 mm dia						
	Ductile Iron specials suitable for mechanical jointing as per I.S.9523 - up to 600 mm dia						
	200mm DI flanged spigot tail piece (long)-2n0+1no maintainance	3				0.230000	0.690
	200mm DI flanged socket tail piece (long)-2n0+1no maintainance	3				0.210000	0.630
	200mmmechanical joint collar-1n0+1no maintainance	2				0.250000	0.500
	200mm*200mm*80mm A/F tee All flangrd tee-1n0_1no for maintainance	2				0.390000	0.780
	200mmD/F Duckfoot bend	2				0.450000	0.900
	200mmD/F 90 degree bend	3				0.310000	0.930

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	200mm 45 degree bend	3				0.260000	0.780
	200mm 22.5 degree bend	3				0.220000	0.660
	200mm 11.25 degree bend	3				0.210000	0.630
	Total						**6.500**
						Total Quantity in quintal	**6.500**
4	Construction of Transformer Room at Well site						
4.001	2.31						
	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared						
	Clearing jungle including uprooting of rank						
	proposed transformer room site	1	15.000	10.000			150.000
	Total						**150.000**
						Total Quantity in sqm	**150.000**
4.002	2.8.1						
	Earth work in excavation by mechanical means (Hydraulic excavator) /manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.All kinds of soil						
	Earth work in excavation by mechanical						
	coloumn trenches	12	1.800	1.800	1.500		58.320
	trench for RRmasonry wall for protection	1	15.000	1.000	0.600		9.000
	Total						**67.320**
						Total Quantity in cum	**67.320**
4.003	2.7.3						
	Earth work in excavation by mechanical means (Hydraulic excavator)/ manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.Hard rock (blasting prohibited)						
	Earth work in excavation by mechanical						
	coloumn trenches	4	1.800	1.800	0.650		8.424
	Total						**8.424**
						Total Quantity in cum	**8.424**
4.004	100.7.1						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Bailing out water with 5HP engine and pump set including conveyance to the site, erecting, dismantling and taking back of engine and pump, cost of fuel lubricating oil and other stores pay of staff etc., complete.						
	Earth work in excavation by mechanical						
	2 no 5 HPpump set used for 10 days 8 hours per day	2	5.000	10.000	8.000	0.750000	600.000
	Total						**600.000**
						Total Quantity in Kwh	**600.000**
4.005	OD152680/2022-2023						
	Boring 30/40mm dia holes of 1.50m deep in rock for anchoring steel bars of columns, using necessary anchors including all hire and labour for jacky- hammer .Anchoring 16mm steel bar in the bore holes already made using cement grout including all hire and labour charges for grouting etc. comlete./Each						
	Boring 30/40mm dia holes of 1.50m deep in rock						
	anchoring steel bars in column trenches in the rock	16					16.000
	Total						**16.000**
						Total Quantity in each	**16.000**
4.006	4.1.8						
	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:4:8 (1 cement : 4 coarse sand : 8 graded stone aggregate 40 nominal size)						
	Providing and laying in position cement concrete						
	pcc for column footing	8	1.800	1.800	0.150		3.888
	pcc for RR masonry	1	15.000	1.000	0.150		2.250
	Total						**6.138**
						Total Quantity in cum	**6.138**
4.007	5.9.1						
	Centering and shuttering including strutting, etc. and removal of form for:Foundations, footings, bases of columns, etc for mass concrete						
	Centering and shuttering including strutting, etc.						
	footing rectangular portion area	8	7.200	0.300			17.280
	footingtrapezoidal portion area	8				2.250000	18.000

DRAFT
PRICE
PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**35.280**
						Total Quantity in sqm	**35.280**
4.008	5.1.2						
	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level:1:1:5:3 (1 cement 1.5 coarse sand :3 graded stone aggregate 20 mm nominal size						
	Providing and laying in position specified grade						
	footing rectangular	8	1.800	1.800	0.300		7.776
	footing trapezoidal portion	8	((1.8*1.8000)+(.7*.7))/2		0.450		6.714
	column	8	0.400	0.400	2.450		3.136
	plinth beam length wise (building 1st)	2	6.4-(3*.4)	0.450	0.300		1.404
	plinth beam length wise (building2nd	4	6.4-(3*.4)	0.450	0.300		2.808
	plinth beambreadth wise (building2nd	3	4.9-(2*.4)	0.450	0.300		1.661
	pile cap	6	1.000	1.000	0.500		3.000
	belt concreat in between RRretaing wall	1	15.000	0.900	0.150		2.025
	Total						**28.524**
						Total Quantity in cum	**28.524**
4.009	5.2.2						
	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. up tot floor five level excluding cost of centering, shuttering, finishing and reinforcement :1:1.5:3(1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size)						
	Reinforced cement concrete work in walls						
	coloumn front side	5	0.400	0.400	2.550		2.040
	coloumn back side	3	0.400	0.400	6.800		3.264
	plinth beam length wise-building	2	2.600	0.300	0.450		0.702

DRAFT

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	beam Ist lengthwise-building	4	2.600	0.300	0.450		1.404
	beam Ist breadth wise-building	3	4.100	0.300	0.450		1.661
	floor beam length wise building	4	2.600	0.300	0.450		1.404
	floor beam breadthwise wise building	3	4.100	0.300	0.450		1.661
	floor beam length wise ramp	2	2.600	0.300	0.450		0.702
	floor beam breadth wise ramp	1	2.300	0.300	0.450		0.311
	floor slab	1	4.900	6.400	0.150		4.704
	lintel beam	1	19.500	0.200	0.150		0.585
	lintel beam above rolling shutter	1	3.100	0.200	0.300		0.186
	sunshade	1	20.100	0.600	0.100		1.206
	sunshade above rolling shutter	1	3.100	1.200	0.125		0.465
	roof beam lengthwise	4	2.600	0.200	0.350		0.728
	roof beam breadth wise	3	4.100	0.200	0.350		0.861
	roof slab	1	6.800	5.300	0.120		4.325
	Total						**26.209**
						Total Quantity in cum	**26.209**
4.010	5.22.6						
	Steel reinforcement for R.C.C work including straightening, cutting, bending, placing in position and binding all complete upto plinth levelThermo - Mechanically Treated bars of grade Fe-500D or more						
	Steel reinforcement for R.C.C work including						
	Vide item no.-8(28.527*90kg/cuM)	1	28.527			90.000000	2567.430
	Vide item no.-9(26.218*90kg/cuM)	1	26.218			90.000000	2359.620
	Pile-(6*3.14*.2*.2*8.5)=6.41CuM.ie,90kg/CuM	6.41				90.000000	576.900

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Pile Cap-(6*1*1*.5)=3Cu M.ie,90kg/CuM	3				90.000000	270.000
	Total						**5773.950**
						Total Quantity in kilogram	**5773.950**
4.011	5.9.6						
	Centering and shuttering including strutting, etc. and removal of form for:Columns, Pillars, Piers, Abutments, Posts and Struts						
	Centering and shuttering including strutting						
	coloumn of building	6	1.600		12.920		124.032
	coloumn of ramp	2	1.600		5.000		16.000
	Total						**140.032**
						Total Quantity in sqm	**140.032**
4.012	5.9.5						
	Centering and shuttering including strutting, etc. and removal of form for:Lintels, beams, plinth beams, girders bressumers and cantilevers						
	Centering and shuttering including strutting						
	plinth beam lengthwise(building)	2	6.4-(.4*4)	1.200			11.520
	plinth beam breadth wise(building)	3	4.9-(.4*2)	1.200			14.760
	Brace Ist lift lengthwise(building	1	6.4-(.4*4)	1.200			5.760
	Brace Ist lift length wise(ramp)	2	3-(.4*1)	1.200			6.240
	Brace Ist lift breadth wise(ramp)	1	3.1-(.4*2)	1.200			2.760
	floor beam lengthwise(building)	2	6.4-(.4*4)	1.200			11.520
	floor beam breadth wise(building)	3	4.9-(.4*2)	1.200			14.760
	floor beam length wise(ramp)	2	3-(.4*1)	1.200			6.240
	floor beam breadth wise(ramp)	1	3.1-(.4*2)	1.200			2.760

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	lintel beam	1	16.100	0.500			8.050
	lintel beam above rolling shutter	1	5.000	0.800			4.000
	roof beam length wise	2	6.4-(.4*4)	0.900			8.640
	roof beam length wise	3	4.9-(.4*2)	0.900			11.070
	Total						**108.080**
						Total Quantity in sqm	**108.080**
4.013	5.9.19						
	Centering and shuttering including strutting, etc. and removal of form for:Weather shade, Chajjas, corbels etc., including edges						
	Centering and shuttering including strutting,						
	sunshade	1	21.500	0.700			15.050
	sunshade above rolling shutter	1	5.000	1.325			6.625
	Total						**21.675**
						Total Quantity in sqm	**21.675**
4.014	5.9.3						
	Centering and shuttering including strutting, etc. and removal of form for:Suspended floors, roofs, landings, balconies and access platform						
	Centering and shuttering including strutting, etc. and						
	roof slab	1	6.600	5.100			33.660
	ramp floor	1	3.000	3.100			9.300
	Total						**42.960**
						Total Quantity in sqm	**42.960**
4.015	50.6.1.2						
	Solid block masonry using pre cast solid blocks (Factory made) of size 40x20x20cm or nearest available size confirming to IS 2185 part I of 1979 for super structure up to floor two level thickness 20cm and above in: CM 1:6 (1 cement: 6 coarse sand) etc complete.						
	Solid block masonry using pre cast solid blocks						
	transformer room side wall	1	21.800	0.200	4.000		17.440
	windows	-3	1.500	0.200	1.500		-1.350
	rolling shutter	-1	2.500	0.200	3.000		-1.500
	Total						**14.590**
						Total Quantity in cum	**14.590**
4.016	50.6.6.2						

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Hollow block masonry using pre cast solid blocks (factory made) of size 40x20x10cm or nearest available size confirming to IS 2185 part I of 1979 for Super structure up to floor two level for 10 cm thick wall in: CM 1:6 (1 cement : 6 coarse sand) including cost of scaffolding etc complete						
	Hollow block masonry using pre cast solid b						
	parapet	1	21.800	0.100	0.900		1.962
	Total						**1.962**
						Total Quantity in cum	**1.962**
4.017	7.1.1						
	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)						
	Random rubble masonry with hard stone						
	RR retaining wall in river side is necessary for protect the building	1	15.000	0.900	4.000		54.000
	Total						**54.000**
						Total Quantity in cum	**54.000**
4.018	2.25						
	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundation etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m.						
	Filling available excavated earth (excluding rock)						
	filling earth	1	15.000	5.000	4.000		300.000
	Total						**300.000**
						Total Quantity in cum	**300.000**
4.019	13.1.1						
	12 mm cement plaster of mix:1:4 (1 cement : 4 fine sand)						
	12 mm cement plaster of mix:						
	outer wall	1	22.600		4.000		90.400
	inner wall	1	22.600		4.000		90.400
	floor slab top	1	6.000	4.500			27.000
	floor slab bottom	1	6.000	4.500			27.000
	floor beam breadthwise	3	4.100	1.000			12.300
	floor beam lengthwise	2	5.200	1.000			10.400
	roof floor bottom	1	6.000	4.500			27.000

DRAFT
e-PLATFORM FOR THE MANAGEMENT OF PUBLIC WORKS

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	roof beam	1	4.100	0.700			2.870
	roof floor top	1	6.400	4.900			31.360
	sunshade	1	22.100	1.300			28.730
	sunshade above rolling shutter	1	4.300	2.525			10.858
	parapet wall	1	23.000	2.020			46.460
	ramp floor	1	3.000	3.100			9.300
	plastering RR top	1	10.000	1.000			10.000
	Rolling shutter	1	2.500	3.000			7.500
	column of building	3	1.600		9.250		44.400
	column of building	3	1.600		5.000		24.000
	column of ramp	2	1.600		5.000		16.000
	rolling shutter	-1	2.500	3.000			-7.500
	windows	-3	1.500	1.500			-6.750
	Total						**501.728**
						Total Quantity in sqm	**501.728**
4.020	13.44.1						
	Finishing walls with water proofing cement paint of required shade:New work (Two or more coats applied @ 3.84 kg/10 sqm)						
	Finishing walls with water proofing cement						
	outer wall	1	22.600		4.000		90.400
	inner wall	1	22.600		4.000		90.400
	floor slab bottom	1	6.000	4.500			27.000
	floor beam breadth wise	3	4.100	1.000			12.300
	floor beamlength wise	2	5.300	1.000			10.600
	roof floor bottom	1	6.000	4.500			27.000
	roof beam	1	4.100	0.700			2.870
	sun shade	1	22.100	1.300			28.730
	sun shade above rolling shutter	1	4.300	2.525			10.858
	parapet wall	1	23.000	2.020			46.460
	column of building	3	1.600		9.250		44.400
	column of building	3	1.600		5.000		24.000
	column oframp	2	1.600	5.000			16.000

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	rolling shutter	-1	2.500	3.000			-7.500
	windows	-3	1.500	1.500			-6.750
	Total						**416.768**
						Total Quantity in sqm	**416.768**
4.021	13.60.1						
	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade:Two or more coats on new work						
	Wall painting with acrylic emulsion paint of approved						
	outer wall	1	22.600	4.000			90.400
	inner wall	1	22.600	4.000			90.400
	floorbslab bottom	1	6.000	4.500			27.000
	floor beam breadthwise	3	4.100	1.000			12.300
	floor beam lengthwise	2	5.300	1.000			10.600
	roof floor bottom	1	6.000	4.500			27.000
	roof beam	1	4.100	0.700			2.870
	sunshade	1	22.100	1.300			28.730
	sunshade above rolling shutter	1	4.300	2.525			10.858
	parapet wall	1	23.000	2.020			46.460
	coloumn of building	3	1.600		9.250		44.400
	coloumn of building	3	1.600		5.000		24.000
	coloumn of ramp	2	1.600		5.000		16.000
	rolling shutter	-1	2.500	3.000			-7.500
	windows	-3	1.500	1.500			-6.750
	Total						**416.768**
						Total Quantity in sqm	**416.768**
4.022	13.50.3						
	Applying priming coat:With ready mixed red oxide zinc chromate primer of approved brand and manufacture on steel galvanised iron /steel works						
	Applying priming coat:						
	rolling shutter(25% extra area for shutter)	2	2.500	3.000		1.250000	18.750
	door &window	1				20.000000	20.000
	Total						**38.750**

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
						Total Quantity in sqm	**38.750**
4.023	13.52.1						
	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On steel work						
	Finishing with Epoxy paint (two or more coats						
	rolling shutter(25%extra area for shutter)	2	3.000	3.000		1.250000	22.500
	door & window	1				20.000000	20.000
	Total						**42.500**
						Total Quantity in sqm	**42.500**
4.024	10.6.2						
	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.80x1.20 mm M.S. laths with 1.20 mm thick top cover						
	Supplying and fixing rolling shutters						
	rolling shutter	1	2.500	3.000			7.500
	Total						**7.500**
						Total Quantity in sqm	**7.500**
4.025	OD152681/2022-2023						
	Providing and fixing glazed shutters for doors, windows and clerestory windows using 4 mm thick float glass panes, including ISI marked M.S. pressed butt hinges bright finished of required size with necessary screws.						
	Providing and fixing glazed shutters for						
	windows	3	1.500	1.500			6.750
	Total						**6.750**
						Total Quantity in sqm	**6.750**
4.026	10.26.3						
	Providing and fixing hand rail of approved size by welding etc. to steel ladder railing, balcony railing, staircase railing and similar works, including applying priming coat of approves steel primer.G.I. pipes						
	Providing and fixing hand rail of approved						
	40mm GI pipe 3.72 kg/m	1	24.000			3.720000	89.280

Sl No	Specification	No	Length	Width	Depth	Cf	Quantity
	Total						**89.280**
						Total Quantity in kg	**89.280**
4.027	10.25.2						
	Item Shifted to Sub head 14 as item 14.73 Item Shifted to head 14 as item 14.74 Steel work welded in built up sections/framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works						
	Item Shifted to Sub head 14 as item						
	construction of steel ladder for transformer building	1				200.000000	200.000
	Total						**200.000**
						Total Quantity in kg	**200.000**
4.028	OD152682/2022-2023						
	Supplying and fixing 110mm PVC 6Kg pipe for drain out water from the roof of Transformer room						
	Supplying and fixing 110mm PVC 6Kg						
		2					2.000
	Total						**2.000**
						Total Quantity in metre	**2.000**
4.029	20.1.1						
	Providing, driving and installing driven cast-in-situ reinforced cement concrete piles of grade M-25 of specified diameter and length below the pile cap, to carry safe working load not less than specified, excluding the cost of steel reinforcement but including the cost of shoe and the length of pile to be embedded in the pile cap etc. all complete. (Length of pile for payment shall be measured from top of shoe to the bottom of pile cap):400 mm dia piles						
	Providing, driving and installing driven						
		6			8.500		51.000
	Total						**51.000**
						Total Quantity in metre	**51.000**
5	Road Restoration Charges						
5.001	OD152688/2022-2023						
	Road restoration Charges- PWD Road4680.65/m2						
	Road restoration Charges- PWD Road4680.65/m2						
	200mm DI pipe	1	20.000	1.000			20.000
	Total						**20.000**
						Total Quantity in sqm	**20.000**

Annual Operation and Maintenance Cost for 5 Years@ 8% Annual Increase							
Fixed O&M Cost(Including Electricity Charge)							
SL NO	**Year**	**Manpower at Pumping Station**	**DG Set fuel @ PS**	**Sewer Network**	**Civil, Mechanical & Electrical**	**Electricity Charge**	**Total Fixed Cost**
1	2025	925297.0	296458	1711128.0	210000.0	480000.0	3622883.0
2	2026	999321	320175	1848018	226800	518400	**3912714**
3	2027	1079267	345789	1995859	244944	559872	**4225731**
4	2028	1165608	373452	2155528	264540	604662	**4563789**
5	2029	1258857	403328	2327970	285703	653035	**4928892**
	Total	**5428350.0**	**1739201.0**	**10038503.0**	**1231987.0**	**2815969.0**	**17631126.0**
Total Fixed Cost							**17631126.00**
18% GST							**3173603.00**
Total Fixed Cost including 18% GST							**20804729.00**

APPENDIX 1 - SEWERAGE NETWORK DESIGN

CONDUIT DETAILS

CONDUIT	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (m)	Slope (%)	Diameter (mm)
p3	n3	4.93	n4	4.85	30	0.3	236.1
p4	n4	4.85	n5	4.78	30	0.2	236.1
p6	n6	4.63	n7	4.59	28.5	0.2	299.5
p7	n7	4.59	n8	4.54	30	0.2	299.5
p8	n8	4.54	n9	4.48	30	0.2	299.5
p9	n9	4.48	n10	4.43	30	0.2	299.5
p10	n10	4.43	n11	4.38	30	0.2	299.5
p11	n11	4.38	n12	4.34	24.3	0.2	299.5
p12	n12	4.34	n13	4.28	35.7	0.2	299.5
p13	n13	4.28	n14	4.23	30	0.2	299.5
p14	n14	4.23	n15	4.18	30	0.2	299.5
p15	n15	4.18	n16	4.13	30	0.2	299.5
p17	n17	4.08	n18	4.03	30	0.2	299.5
p18	n18	4.03	n19	3.97	30	0.2	299.5
p19	n19	3.97	n20	3.92	30	0.2	299.5
p20	n20	3.92	n21	3.87	30	0.2	299.5
p21	n21	3.87	n22	3.82	30	0.2	299.5
p22	n22	3.82	n23	3.77	30	0.2	299.5
p23	n23	3.77	n24	3.72	30	0.2	299.5
p25	MH-78	3.67	n26	3.62	27.1	0.2	299.5
p26	n26	3.62	n27	3.57	32.8	0.2	299.5
p27	n27	3.57	n28	3.52	30	0.2	299.5
p28	n28	3.52	n29	3.48	22.9	0.2	299.5
p30	n31	4.28	MH-144	4.16	30	0.4	189.5
p31	n32	4.4	n31	4.28	30	0.4	189.5
p32	n33	4.52	n32	4.4	30	0.4	189.5
p33	n34	4.64	n33	4.52	30	0.4	189.5
p34	n35	4.76	n34	4.64	30	0.4	189.5
p35	n36	4.88	n35	4.76	30	0.4	189.5
p36	n37	5	n36	4.88	30	0.4	189.5
p37	n38	5.12	n37	5	30	0.4	189.5
p38	n39	5.24	n38	5.12	30	0.4	189.5
p39	n40	5.36	n39	5.24	30	0.4	189.5
p40	n41	5.48	n40	5.36	30	0.4	189.5
p41	n42	5.6	n41	5.48	30	0.4	189.5
p43	n44	5.84	n43	5.72	30	0.4	189.5
p57	n57	7.25	n58	7.13	30	0.4	189.5
p58	n58	7.13	n59	7.01	30	0.4	189.5
p59	n59	7.01	n60	6.89	30	0.4	189.5
p60	n60	6.89	n61	6.77	30	0.4	189.5
p61	n61	6.77	n62	6.65	30	0.4	189.5
p64	n63	6.54	n64	6.42	30.4	0.4	189.5
p65	n64	6.42	n65	6.3	30	0.4	189.5
p66	n65	6.3	n66	6.27	7.6	0.4	189.5
p67	n66	6.27	n67	6.06	52.3	0.4	189.5

p68	n67	6.06	n68	5.94	30	0.4	189.5
p69	n68	5.94	n69	5.82	30	0.4	189.5
p70	n69	5.82	n70	5.7	30	0.4	189.5
p71	n70	5.7	n71	5.67	8.3	0.4	189.5
p72	n71	5.67	n72	5.6	19.6	0.3	189.7
p75	n74	5.5	n75	5.4	30	0.3	189.7
p77	n77	7.49	n75	7.37	29.9	0.4	189.5
p80	n80	7.61	n79	7.53	19.7	0.4	189.5
p81	n81	7.73	n80	7.61	30	0.4	189.5
p83	n82	7.34	n83	7.3	11.7	0.4	189.5
p84	n83	7.3	n84	7.18	30	0.4	189.5
p88	n87	6.34	n88	6.3	10.6	0.4	189.5
p89	n88	6.3	n89	6.18	30	0.4	189.5
p90	n89	6.18	n90	6.06	29.9	0.4	189.5
p91	n90	6.06	n91	5.94	30	0.4	189.5
p92	n91	5.94	n92	5.82	30	0.4	189.5
p93	n92	5.82	n93	5.76	16.2	0.4	189.5
p94	n93	5.76	n94	5.71	13.8	0.3	189.7
p97	n96	5.61	n97	5.58	7.6	0.3	189.7
p99	n97	5.58	n98	5.41	51	0.3	189.7
p100	n99	3.25	n98	3.22	29.9	0.1	377.9
p101	n100	3.29	n99	3.25	29.8	0.1	377.9
p102	n101	3.33	n100	3.29	30	0.1	377.9
p103	n102	3.36	n101	3.33	30	0.1	377.9
p104	n29	3.4	n102	3.36	30	0.1	377.9
p106	n104	7.52	n103	7.4	30	0.4	189.5
p107	n105	7.7	n104	7.52	25	0.7	189.5
p109	n106	7.2	n107	7.16	10	0.4	189.5
p110	n107	7.16	n108	7.04	30	0.4	189.5
p111	n108	7.04	n109	6.92	30	0.4	189.5
p112	n109	6.92	n110	6.8	30	0.4	189.5
p113	n110	6.8	n111	6.68	30	0.4	189.5
p114	n111	6.68	n86	6.56	29.9	0.4	189.5
p117	n113	7.26	n114	7.14	30	0.4	189.5
p118	n114	7.14	n115	7.02	30	0.4	189.5
p119	n115	7.02	n116	6.9	30	0.4	189.5
p120	n116	6.9	n66	6.78	30	0.4	189.5
p121	n117	6.69	n118	6.63	6.1	1	189.5
p124	n123	6.11	n122	5.99	30	0.4	189.5
p125	n124	6.23	n123	6.11	30	0.4	189.5
p126	n125	6.29	n124	6.23	17.1	0.4	189.5
p127	n126	6.54	n125	6.42	11.6	1	189.5
p128	n127	6.46	n128	6.41	11.5	0.4	189.5
p130	n75	5.4	n129	5.32	24.1	0.3	189.7
p131	n129	5.32	n130	5.22	30	0.3	189.7
p132	n130	5.22	n131	5.12	29.9	0.3	189.7
p133	n131	5.12	n132	5.02	30	0.3	189.7
p135	n133	4.99	n134	4.92	21.6	0.3	189.7
p136	n134	4.92	n135	4.82	30	0.3	189.7
p137	n135	4.82	n136	4.72	30	0.3	189.7

p138	n136	4.72	n137	4.62	30	0.3	189.7
p139	n137	4.62	n138	4.53	30	0.3	189.7
p145	n144	3.18	n143	3.15	30	0.1	377.9
p149	n148	5.6	n147	5.5	30	0.3	189.7
p150	n149	5.63	n148	5.6	7.3	0.3	189.7
p151	n151	5.8	n150	5.7	28.2	0.3	189.7
p152	n152	5.9	n151	5.8	30	0.3	189.7
p153	n153	6	n152	5.9	30	0.3	189.7
p154	n154	6.1	n153	6	30	0.3	189.7
p155	n155	6.13	n154	6.1	7.9	0.3	189.7
p159	n159	6.4	n158	6.3	30	0.3	189.7
p160	n160	6.49	n159	6.4	30	0.3	189.7
p170	n168	8.7	n169	8.58	30	0.4	189.5
p171	n169	8.58	n170	8.52	16.5	0.4	189.5
p173	n172	6.86	n93	6.82	8.2	0.4	189.5
p174	n173	6.94	n172	6.86	21.8	0.4	189.5
p175	n174	7.03	n173	6.94	21	0.4	189.5
p181	n180	7.16	n179	7.12	3.7	1	189.5
p186	n138	3	n184	2.97	27	0.1	377.9
p187	n184	2.97	n185	2.93	30	0.1	377.9
p188	n185	2.93	n186	2.86	60.1	0.1	377.9
p189	n186	2.86	n187	2.85	7.6	0.1	377.9
p191	n188	2.82	n189	2.81	10.7	0.1	377.9
p192	n189	2.72	n190	2.7	19.3	0.1	470.5
p193	n190	2.7	n191	2.67	30	0.1	470.5
p199	n196	8.92	n197	8.87	13.1	0.4	189.5
p202	n199	8.44	n200	8.29	18.8	0.8	189.5
p203	n200	8.29	n201	8.19	11.2	0.9	189.5
p204	n201	8.19	n202	8.14	13.7	0.4	189.5
p209	n204	8.11	n205	7.75	37.5	1	189.5
p214	n207	7.39	n208	7.28	27	0.4	189.5
p215	n208	7.28	n209	7.16	30	0.4	189.5
p217	n209	7.16	n210	7.04	30	0.4	189.5
p218	n210	7.04	n211	7.03	2.6	0.4	189.5
p219	n211	7.03	n212	7.02	3.6	0.4	189.5
p220	n212	7.02	n213	6.92	23.8	0.4	189.5
p221	n213	6.92	n214	6.8	30	0.4	189.5
p222	n214	6.8	n215	6.75	12.2	0.4	189.5
p225	n217	6.68	n218	6.56	30	0.4	189.5
p226	n218	6.56	n219	6.51	13.2	0.4	189.5
p227	n219	6.51	n220	6.44	16.8	0.4	189.5
p228	n220	6.44	n221	6.34	30	0.3	189.7
p230	n221	6.34	n222	6.24	29.8	0.3	189.7
p231	n222	6.24	n223	6.18	18.5	0.3	189.7
p232	n223	6.18	n224	6.14	11.5	0.3	189.7
p233	n224	6.14	n225	6.05	29.9	0.3	189.7
p236	n227	2.46	n228	2.43	25.4	0.1	470.5
p297	n286	7.26	n279	7.16	9.8	1	189.5
p299	n289	7.62	n288	7.53	18.2	0.5	189.5
p311	n301	7.18	n300	7.06	30	0.4	189.5

p312	n302	7.3	n301	7.18	30	0.4	189.5
p313	n303	7.39	n302	7.3	23.6	0.4	189.5
p314	n304	7.78	n303	7.75	6.4	0.4	189.5
p315	n305	7.87	n304	7.78	22.7	0.4	189.5
p320	n309	7.61	n308	7.51	25.3	0.4	189.5
p323	n312	8.11	n311	7.99	30	0.4	189.5
p324	n313	8.16	n312	8.11	13.1	0.4	189.5
p326	n314	7.03	n167	6.96	18.7	0.4	189.5
p329	n317	7.8	n316	7.69	27.1	0.4	189.5
p330	n318	7.92	n317	7.8	30	0.4	189.5
p331	n319	8.04	n318	7.92	30	0.4	189.5
p332	n320	8.16	n319	8.04	29.6	0.4	189.5
p334	n321	8.57	n320	8.45	30.3	0.4	189.5
p342	n329	9.11	n328	8.99	30	0.4	189.5
p345	n332	8.17	n331	8.05	30	0.4	189.5
p346	n333	8.25	n332	8.17	18.6	0.4	189.5
p347	n334	5.87	n6	5.77	29.9	0.3	189.7
p348	n335	5.97	n334	5.87	30	0.3	189.7
p349	n336	6.06	n335	5.97	30	0.3	189.7
p350	n337	6.12	n336	6.06	17	0.3	189.7
p351	n338	6.16	n337	6.12	13	0.3	189.7
p352	n339	6.26	n338	6.16	30	0.3	189.7
p355	n341	6.36	n331	6.31	14.3	0.3	189.7
p356	n342	6.46	n341	6.36	30	0.3	189.7
p357	n343	6.49	n342	6.46	7.8	0.3	189.7
p358	n344	6.54	n343	6.49	17.1	0.3	189.7
p361	n347	6.76	n346	6.66	30.4	0.3	189.7
p364	n350	6.94	n349	6.86	24.8	0.3	189.7
p365	n351	6.95	n350	6.94	5.1	0.3	189.7
p366	n352	7.05	n351	6.95	30	0.3	189.7
p367	n353	7.15	n352	7.05	30	0.3	189.7
p368	n354	7.17	n353	7.15	6.2	0.3	189.7
p369	n355	7.21	n354	7.17	10.1	0.3	189.7
p370	n356	7.48	n355	7.41	17.7	0.4	189.5
p371	n357	7.6	n356	7.48	30	0.4	189.5
p379	n366	8.03	n343	7.91	30	0.4	189.5
p380	n367	8.15	n366	8.03	30	0.4	189.5
p381	n368	8.27	n367	8.15	30.7	0.4	189.5
p382	n369	7.81	n347	7.51	30	1	189.5
p383	n370	8.12	n369	7.98	26.5	0.5	189.5
p384	n371	7.31	n350	7.19	29.8	0.4	189.5
p385	n372	7.43	n371	7.31	30	0.4	189.5
p388	n375	8.27	n320	8.16	29.6	0.4	189.5
p389	n376	8.39	n375	8.27	30	0.4	189.5
p390	n377	7.4	n316	7.16	60	0.4	189.5
p391	n378	7.5	n377	7.4	23.7	0.4	189.5
p393	n379	8.38	n378	8.26	30	0.4	189.5
p394	n380	8.5	n379	8.38	30	0.4	189.5
p395	n381	8.55	n380	8.5	13.4	0.4	189.5
p398	n384	7.52	n378	7.5	6.3	0.4	189.5

p399	n385	7.64	n384	7.52	30	0.4	189.5
p400	n386	7.76	n385	7.64	30	0.4	189.5
p401	n387	7.86	n386	7.76	23.2	0.4	189.5
p402	n388	8.03	n387	7.99	6.8	0.5	189.5
p404	n390	7.98	n387	7.86	30.1	0.4	189.5
p407	n393	7.31	n149	7.04	29.9	0.9	189.5
p408	n394	7.53	n393	7.31	30	0.7	189.5
p409	n395	7.65	n394	7.53	29.8	0.4	189.5
p410	n396	7.77	n395	7.65	30	0.4	189.5
p411	n397	7.89	n396	7.77	30	0.4	189.5
p412	n398	7.94	n397	7.89	11.2	0.5	189.5
p414	n400	7.84	n399	7.72	29.9	0.4	189.5
p415	n402	8.08	n401	7.96	30	0.4	189.5
p417	n404	8.31	n403	8.2	28.2	0.4	189.5
p418	n405	8.32	n404	8.31	1.9	0.4	189.5
p419	n406	8.39	n405	8.32	18.4	0.4	189.5
p421	n409	7.76	n359	7.64	30	0.4	189.5
p422	n410	7.88	n409	7.76	29.7	0.4	189.5
p423	n411	8	n410	7.88	29.8	0.4	189.5
p424	n412	8.12	n411	8	25.6	0.5	189.5
p426	n414	7.9	n413	7.78	29.7	0.4	189.5
p427	n415	8.02	n414	7.9	29.8	0.4	189.5
p430	n418	8.33	n417	8.14	29.8	0.6	189.5
p431	n419	8.41	n418	8.33	20.1	0.4	189.5
p432	n420	8.24	n417	8.14	24.7	0.4	189.5
p433	n421	8.36	n420	8.24	30	0.4	189.5
p434	n422	8.46	n421	8.36	25.8	0.4	189.5
p437	n426	9.25	n425	9.12	29.9	0.4	189.5
p441	n429	6.89	n430	6.82	17.4	0.4	189.5
p442	n430	6.82	n431	6.7	29.9	0.4	189.5
p443	n431	6.7	n432	6.58	30	0.4	189.5
p444	n432	6.58	n433	6.46	30	0.4	189.5
p445	n433	6.46	n434	6.34	30	0.4	189.5
p446	n434	6.34	n435	6.22	30	0.4	189.5
p447	n435	6.22	n436	6.1	29.9	0.4	189.5
p448	n436	6.1	n437	5.99	29.8	0.4	189.5
p473	n425	9.12	n424	9	30	0.4	189.5
p474	n459	6.83	n164	6.8	6.9	0.3	189.7
p475	n165	6.87	n460	6.85	5	0.4	189.5
p476	n460	6.85	n459	6.83	8.1	0.3	189.7
p478	n401	7.96	n400	7.84	30	0.4	189.5
p479	n118	6.63	n461	6.51	30	0.4	189.5
p480	n462	8.13	n72	8.01	29.9	0.4	189.5
p481	n463	8.25	n462	8.13	30	0.4	189.5
p482	n464	8.37	n463	8.25	30	0.4	189.5
p483	n465	8.49	n464	8.37	30	0.4	189.5
p484	n466	8.61	n465	8.49	30	0.4	189.5
p485	n467	8.68	n466	8.61	17.2	0.4	189.5
p486	n468	8.78	n467	8.68	26	0.4	189.5
p489	n471	6.62	n71	6.5	30	0.4	189.5

p492	n474	6.86	n473	6.76	24.9	0.4	189.5
p493	n475	6.98	n474	6.86	30	0.4	189.5
p494	n476	7.09	n475	6.98	28	0.4	189.5
p495	n477	8.15	n473	8.02	30	0.4	189.5
p496	n478	8.27	n477	8.15	30	0.4	189.5
p499	n481	8.45	n480	8.39	14.9	0.4	189.5
p500	n482	8.71	n481	8.45	29.9	0.9	189.5
p501	n483	8.83	n482	8.71	29.8	0.4	189.5
p502	n484	8.5	n481	8.45	13.2	0.4	189.5
p503	n485	8.62	n484	8.5	30	0.4	189.5
p504	n486	8.71	n485	8.62	21.6	0.4	189.5
p505	n487	7.51	n207	7.39	29.9	0.4	189.5
p508	n490	8.96	n480	8.78	30	0.6	189.5
p509	n491	9.08	n490	8.96	20.2	0.6	189.5
p510	n492	8.3	n186	8.18	30	0.4	189.5
p511	n493	8.42	n492	8.3	30	0.4	189.5
p512	n494	8.54	n493	8.42	30	0.4	189.5
p513	n495	8.66	n494	8.54	30	0.4	189.5
p514	n496	8.71	n495	8.66	5.8	0.8	189.5
p516	n497	8.44	n498	8.14	30	1	189.5
p517	n498	7.96	n219	7.66	30	1	189.5
p518	n193	2.63	n499	2.61	26	0.1	470.5
p519	n499	2.61	n500	2.58	30	0.1	470.5
p520	n500	2.58	n501	2.55	30	0.1	470.5
p521	n501	2.55	n502	2.52	30	0.1	470.5
p522	n502	2.52	n225	2.49	29.4	0.1	470.5
p524	n503	9.13	n504	9.1	8.2	0.4	189.5
p525	n504	9.1	n505	8.98	30	0.4	189.5
p529	n508	8.39	n509	8.33	16.3	0.4	189.5
p530	n509	8.33	n510	8.21	30	0.4	189.5
p532	n511	6.11	n26	5.99	30	0.4	189.5
p533	n512	6.23	n511	6.11	30	0.4	189.5
p534	n513	6.35	n512	6.23	30	0.4	189.5
p535	n514	6.47	n513	6.35	30	0.4	189.5
p536	n515	6.56	n514	6.47	21.1	0.4	189.5
p538	n517	9.41	n516	9.29	24.8	0.4	189.5
p539	n518	9.5	n517	9.41	21.9	0.4	189.5
p540	n461	6.51	n119	6.47	9.8	0.4	189.5
p541	n519	6.6	n461	6.51	18.2	0.5	189.5
p542	n520	6.81	n96	6.69	30	0.4	189.5
p543	n521	6.93	n520	6.81	29.6	0.4	189.5
p551	n530	8.34	n531	8.26	20.3	0.4	189.5
p552	n531	8.26	n532	8.22	9.7	0.4	189.5
p553	n532	8.22	n533	8.1	30	0.4	189.5
p554	n533	8.1	n344	7.92	30	0.6	189.5
p556	n536	7.74	n535	7.51	29.6	0.8	189.5
p557	n537	7.83	n536	7.74	23.2	0.4	189.5
p559	n538	7.26	n355	7.21	13.6	0.4	189.5
p560	n539	7.77	n12	7.65	30	0.4	189.5
p561	n540	8	n539	7.77	30	0.8	189.5

p562	n541	8.05	n540	8	11.3	0.4	189.5
p468	n292	7.35	n291	7.24	27.8	0.4	189.5
p470	n295	8.09	n296	8	22.2	0.4	189.5
CO-4	n72	5.6	n74	5.5	31.9	0.3	189.7
CO-6	n79	7.53	n77	7.49	10.2	0.4	189.5
CO-8	n84	7.18	n86	7.04	33.2	0.4	189.5
CO-10	n94	5.71	n96	5.61	31.2	0.3	189.7
CO-12	n98	3.22	n144	3.18	29.9	0.1	377.9
CO-16	n147	5.5	MH-1	5.43	21.9	0.3	189.7
p165(2)	n164	6.8	MH-3	6.72	26	0.3	189.7
CO-26	MH-3	6.72	n161	6.59	37.3	0.3	189.7
CO-28	n170	8.52	n529	8.45	17.3	0.4	189.5
p550(1)	n529	8.45	MH-4	8.42	6.7	0.4	189.5
p550(2)	MH-4	8.42	n530	8.34	19.4	0.4	189.5
CO-30	n176	7.06	n174	7.03	4.2	0.6	189.5
CO-32	n179	7.12	n176	7.06	15.9	0.4	189.5
CO-36(1)	MH-5	7.44	n180	7.16	29	1	189.5
CO-36(2)	n183	7.65	MH-5	7.44	23.2	0.9	189.5
CO-40	n202	8.14	n204	8.11	6.6	0.4	189.5
CO-44	n215	6.75	n217	6.68	17.7	0.4	189.5
CO-46	n225	2.49	n227	2.46	30.5	0.1	470.5
CO-60	n308	7.51	n303	7.39	30	0.4	189.5
CO-62	n311	7.99	n305	7.87	29.7	0.4	189.5
CO-64	n316	7.16	n314	7.03	32.9	0.4	189.5
CO-66	n323	7.52	MH-85	7.39	32.9	0.4	189.5
CO-68	MH-85	7.39	n538	7.26	32.1	0.4	189.5
CO-70	n346	6.66	n344	6.54	35.1	0.3	189.7
CO-72	n359	7.64	n357	7.6	11.4	0.4	189.5
CO-74	n383	8.6	n381	8.55	12.7	0.4	189.5
CO-76	n392	8.11	n390	7.98	32.2	0.4	189.5
CO-78	n427	8.91	n404	8.88	7.6	0.4	189.5
CO-80	n417	8.14	n415	8.02	30.7	0.4	189.5
CO-82	n424	9	n420	8.86	34.5	0.4	189.5
CO-84	n470	8.78	n467	8.68	15.7	0.6	189.5
CO-86	n480	8.39	n478	8.27	31.4	0.4	189.5
CO-88	n489	7.63	n487	7.51	30.9	0.4	189.5
CO-90	n528	8.86	n170	8.73	32.7	0.4	189.5
p376(1)	MH-8	8.73	n363	8.58	19.5	0.7	189.5
p169(2)	MH-9	8.81	n168	8.7	10.8	1	189.5
p161(1)	MH-10	6.58	n160	6.49	24.3	0.3	189.7
CO-92	n361	8.46	n359	8.39	18.5	0.4	189.5
CO-94	n363	8.58	n361	8.46	30	0.4	189.5
CO-96	n535	6.79	n347	6.76	9.2	0.3	189.7
CO-102	n349	6.86	n535	6.79	20.4	0.3	189.7
p87(1)	n86	6.56	MH-17	6.5	13.9	0.4	189.5
p87(2)	MH-17	6.35	n87	6.34	2.2	0.4	189.5
CO-108	n119	6.47	MH-17	6.35	30	0.4	189.5
p16(1)	n16	4.13	MH-18	4.1	17.8	0.2	299.5
p16(2)	MH-18	4.1	n17	4.08	12.2	0.2	299.5
CO-112	n288	7.53	n286	7.39	20.1	0.7	189.5

p42(1)	MH-19	5.66	n42	5.6	15.7	0.4	189.5
p42(2)	n43	5.72	MH-19	5.66	14.3	0.4	189.5
CO-114	n122	5.99	MH-19	5.86	30	0.4	189.5
q2	m3	5.26	m2	5.16	30	0.3	189.7
q3	m4	5.36	m3	5.26	30	0.3	189.7
q6	m7	5.55	m6	5.46	28.4	0.3	189.7
q7	m8	5.65	m7	5.55	30	0.3	189.7
q8	m9	5.68	m8	5.65	9.3	0.3	189.7
q9	m10	5.75	m9	5.68	20.8	0.3	189.7
q10	m11	5.85	m10	5.75	30	0.3	189.7
q11	m12	5.95	m11	5.85	30	0.3	189.7
q12	m13	6.05	m12	5.95	30	0.3	189.7
q13	m14	6.13	m13	6.05	24.6	0.3	189.7
q14	m15	6.15	m14	6.13	5.4	0.3	189.7
q15	m16	6.25	m15	6.15	30	0.3	189.7
q16	m17	6.35	m16	6.25	30	0.3	189.7
q17	m18	6.44	m17	6.35	27.9	0.3	189.7
q21	m22	6.64	m21	6.56	25.4	0.3	189.7
q22	m23	6.74	m22	6.64	30	0.3	189.7
q23	m24	6.81	m23	6.74	21	0.3	189.7
q24	m25	6.85	m24	6.81	9	0.4	189.5
q25	m26	6.97	m25	6.85	30	0.4	189.5
q26	m27	7.09	m26	6.97	30	0.4	189.5
q27	m28	7.21	m27	7.09	30	0.4	189.5
q28	m29	7.33	m28	7.21	30	0.4	189.5
q31	m32	7.57	m31	7.53	9.9	0.4	189.5
q32	m33	7.69	m32	7.57	30	0.4	189.5
q33	m34	7.81	m33	7.69	30	0.4	189.5
q34	m35	7.93	m34	7.81	30	0.4	189.5
q35	m36	8.05	m35	7.93	30	0.4	189.5
q36	m37	8.17	m36	8.05	30	0.4	189.5
q37	m38	8.29	m37	8.17	30	0.4	189.5
q38	m39	8.32	m38	8.29	8.9	0.4	189.5
q39	m52	8.87	m53	8.58	30	1	189.5
q40	m53	8.58	m54	8.49	23.2	0.4	189.5
q41	m54	8.49	m55	8.46	6.8	0.4	189.5
q42	m55	8.46	m56	8.34	30	0.4	189.5
q43	m56	8.34	m57	8.22	30	0.4	189.5
q44	m57	8.22	m58	8.16	13.8	0.4	189.5
q45	m58	8.16	m59	8.1	16.1	0.4	189.5
q46	m59	8.1	m60	7.98	30	0.4	189.5
q47	m60	7.98	m61	7.91	16.5	0.4	189.5
q48	m61	7.91	m62	7.86	13.5	0.4	189.5
q49	m62	7.86	m63	7.71	36.8	0.4	189.5
q50	m63	7.71	m64	7.64	18.8	0.4	189.5
q53	m66	7.5	m67	7.43	16.9	0.4	189.5
q54	m67	7.43	m68	7.39	12.8	0.3	189.7
q55	m68	7.39	m69	7.29	30	0.3	189.7
q56	m69	7.29	m70	7.24	15.8	0.3	189.7
q57	m70	7.24	m71	7.21	7.6	0.3	189.7

q58	m71	7.21	m72	7.19	6.6	0.3	189.7
q59	m72	7.19	m73	7.09	30	0.3	189.7
q60	m73	7.09	m74	6.99	30	0.3	189.7
q61	m74	6.99	m75	6.89	30	0.3	189.7
q62	m75	6.89	m76	6.87	6.3	0.3	189.7
q63	m76	6.87	m77	6.8	23.7	0.3	189.7
q64	m77	6.8	m78	6.7	29.9	0.3	189.7
q65	m78	6.7	m79	6.61	28.1	0.3	189.7
q68	m81	6.58	m82	6.5	23.1	0.3	189.7
q69	m82	6.5	m83	6.45	15.2	0.3	189.7
q70	m83	6.45	m84	6.4	14.8	0.3	189.7
q71	m84	6.4	m85	6.3	30	0.3	189.7
q72	m85	6.3	m86	6.23	21.3	0.3	189.7
q73	m86	6.23	m87	6.2	8.7	0.3	189.7
q74	m87	6.2	m88	6.11	30	0.3	189.7
q75	m88	6.11	m89	6.09	6	0.3	189.7
q76	m89	4.57	m90	4.49	24	0.3	189.7
q77	m90	4.49	m91	4.39	27.9	0.3	189.7
q80	m93	4.29	m94	4.19	30	0.3	189.7
q81	m94	4.19	m95	4.09	30	0.3	189.7
q82	m95	4.09	m96	4.02	22.1	0.3	189.7
q83	m96	3.97	m97	3.88	37.9	0.3	236.1
q84	m97	3.88	m98	3.85	10.5	0.2	236.1
q85	m98	3.85	m99	3.8	19.5	0.3	236.1
q86	m99	3.8	m100	3.73	30	0.3	236.1
q87	m100	3.73	m101	3.65	30	0.3	236.1
q88	m101	3.65	m102	3.58	30	0.2	236.1
q89	m102	3.58	m103	3.54	16.1	0.2	236.1
q90	m103	3.54	m104	3.5	13.9	0.3	236.1
q91	m104	3.5	m105	3.43	30	0.2	236.1
q92	m105	3.43	m106	3.35	30	0.3	236.1
q93	m106	3.35	m107	3.33	9.7	0.3	236.1
q94	m107	3.26	m108	3.23	20.3	0.2	299.5
q95	m108	3.23	m109	3.18	30	0.2	299.5
q96	m109	3.18	m110	3.13	30	0.2	299.5
q97	m110	3.13	m111	3.08	30	0.2	299.5
q98	m111	3.08	m112	3.03	30	0.2	299.5
q99	m112	3.03	m113	2.99	22.6	0.2	299.5
q100	m113	2.99	m114	2.97	7.4	0.2	299.5
q101	m114	2.97	m115	2.95	14.1	0.2	299.5
q102	m115	2.95	m116	2.92	15.9	0.2	299.5
q103	m116	2.92	m117	2.87	30	0.2	299.5
q106	m119	2.82	m120	2.77	29.1	0.2	299.5
q107	m120	2.77	m121	2.72	29.9	0.2	299.5
q108	m121	2.72	m122	2.71	6.4	0.2	299.5
q109	m122	1.41	m123	1.4	7.8	0.2	299.5
q110	m123	1.4	m124	1.36	23.5	0.2	299.5
q130	m143	7.81	m144	7.75	15.7	0.4	189.5
q131	m144	7.75	m145	7.63	30	0.4	189.5
q137	m150	8.77	m63	8.65	30.6	0.4	189.5

q138	m151	8.89	m150	8.77	30	0.4	189.5
q139	m152	8.93	m151	8.89	10.3	0.4	189.5
q140	m153	8.03	m143	7.81	22.1	1	189.5
q157	m170	8.69	m171	8.57	30	0.4	189.5
q158	m171	8.57	m172	8.45	30	0.4	189.5
q159	m172	8.45	m173	8.33	30	0.4	189.5
q161	m176	8.97	m175	8.85	30	0.4	189.5
q162	m177	9.09	m176	8.97	30	0.4	189.5
q163	m178	9.18	m177	9.09	15.4	0.6	189.5
q164	m179	7.51	m76	7.39	30	0.4	189.5
q165	m180	7.63	m179	7.51	30	0.4	189.5
q166	m181	7.75	m180	7.63	30	0.4	189.5
q167	m182	7.87	m181	7.75	30	0.4	189.5
q170	m184	8.11	m175	7.99	28.8	0.4	189.5
q171	m185	8.23	m184	8.11	30	0.4	189.5
q172	m174	8.3	m185	8.23	16.8	0.4	189.5
q173	m186	8.46	m174	8.41	13.2	0.4	189.5
q174	m187	8.51	m186	8.46	12.5	0.4	189.5
q208	m221	8.63	m187	8.51	30	0.4	189.5
q209	m222	8.75	m221	8.63	30	0.4	189.5
q210	m223	8.8	m222	8.75	10.2	0.4	189.5
q216	m228	8.69	m79	8.57	29.6	0.4	189.5
q217	m229	8.81	m228	8.69	30	0.4	189.5
q218	m230	8.93	m229	8.81	30	0.4	189.5
q224	m235	7.92	m236	7.84	16.6	0.4	189.5
q225	m236	7.84	m237	7.82	5.4	0.4	189.5
q226	m237	7.82	m238	7.71	25.6	0.4	189.5
q227	m238	5.41	m239	5.3	28.9	0.4	189.5
q228	m239	5.3	m240	5.18	30	0.4	189.5
q229	m240	5.18	m241	5.12	13.4	0.4	189.5
q230	m242	8.62	m241	8.61	3.3	0.4	189.5
q231	m241	5.12	m243	5.02	25	0.4	189.5
q232	m243	5.02	m244	4.9	30	0.4	189.5
q233	m244	4.9	m245	4.78	30	0.4	189.5
q234	m245	4.78	m246	4.66	30	0.4	189.5
q235	m246	4.66	m89	4.57	30	0.3	189.7
q236	m247	7.84	m91	7.72	30	0.4	189.5
q237	m248	7.96	m247	7.84	30	0.4	189.5
q242	m253	8.36	m83	8.23	30	0.4	189.5
q245	m256	8.13	m86	8.01	30	0.4	189.5
q248	m259	8.04	m235	7.92	28.9	0.4	189.5
q249	m260	8.16	m259	8.04	29.8	0.4	189.5
q250	m261	8.3	m260	8.16	32.7	0.4	189.5
q251	m262	8.5	m237	8.38	30	0.4	189.5
q252	m263	8.62	m262	8.5	30	0.4	189.5
q253	m264	8.68	m263	8.62	14.3	0.4	189.5
q254	m265	5.53	m238	5.41	28.8	0.4	189.5
q257	m268	5.88	m267	5.76	29.2	0.4	189.5
q258	m269	8.24	m249	8.06	30	0.6	189.5
q262	m273	5.16	m98	5.04	30	0.4	189.5

q263	m274	5.28	m273	5.16	30	0.4	189.5
q264	m275	5.38	m274	5.28	23.2	0.4	189.5
q265	m276	5.47	m275	5.38	23.4	0.4	189.5
q271	m282	6.38	m275	6.28	26.3	0.4	189.5
q272	m283	5.59	m276	5.47	29.9	0.4	189.5
q274	m285	6.25	m284	6.22	7.5	0.4	189.5
q275	m286	6.37	m285	6.25	30.5	0.4	189.5
q276	m287	6.71	m284	6.41	30	1	189.5
q277	m288	7.6	m287	7.3	30	1	189.5
q278	m289	7.99	m288	7.92	6.2	1	189.5
q288	m299	5.45	m298	5.33	30	0.4	189.5
q290	m301	5.68	m300	5.56	32.7	0.4	189.5
q291	m296	5.79	m301	5.68	28.5	0.4	189.5
q293	m303	6.03	m302	5.91	30	0.4	189.5
q294	m304	6.15	m303	6.03	28.3	0.4	189.5
q298	m308	6.75	m307	6.7	12.9	0.4	189.5
q299	m309	7.24	m113	6.94	30	1	189.5
q301	m310	7.17	m311	6.99	26.9	0.7	189.5
q302	m311	6.04	m312	6.03	6	0.4	189.5
q303	m312	6.03	m313	5.91	27.1	0.4	189.5
q304	m313	5.91	m314	5.79	30	0.4	189.5
q305	m314	5.79	m315	5.73	13.9	0.4	189.5
q306	m316	6.45	m315	6.33	30	0.4	189.5
q308	m315	5.73	m318	5.67	16.1	0.4	189.5
q309	m318	5.11	m319	4.92	19.7	1	189.5
q310	m320	5.12	m319	4.92	19.9	1	189.5
q311	m321	5.82	m320	5.52	30	1	189.5
q312	m322	6	m321	5.82	30	0.6	189.5
q313	m323	6.04	m322	6	10.9	0.4	189.5
q316	m326	1.62	m122	1.52	29.3	0.3	189.7
q317	m327	1.72	m326	1.62	29.9	0.3	189.7
q318	m328	1.76	m327	1.72	12.9	0.3	189.7
q321	m330	2.18	m329	1.88	29.7	1	189.5
q322	m331	2.27	m330	2.18	12.5	0.7	189.5
q323	m332	6.16	m311	6.04	29.9	0.4	189.5
q324	m333	6.24	m332	6.16	20.9	0.4	189.5
q325	m334	7.52	m333	7.48	9.1	0.4	189.5
q326	m335	7.69	m334	7.52	21.7	0.8	189.5
q327	m336	6.36	m333	6.24	30	0.4	189.5
q328	m337	6.4	m336	6.36	9.3	0.4	189.5
q329	m338	6.48	m337	6.4	20.7	0.4	189.5
q330	m339	6.56	m338	6.48	18.6	0.4	189.5
q333	m342	6.86	m339	6.74	30	0.4	189.5
q334	m343	6.9	m342	6.86	10.3	0.4	189.5
q335	m344	7.26	m337	7.17	20.5	0.4	189.5
q336	m347	8.44	m39	8.32	29.7	0.4	189.5
q339	m350	8.68	m349	8.59	22.9	0.4	189.5
q340	m351	8.71	m350	8.68	9.4	0.4	189.5
q342	m352	8.8	m351	8.71	20.7	0.4	189.5
q343	m353	8.92	m352	8.8	30	0.4	189.5

q344	m354	9.04	m353	8.92	30	0.4	189.5
q346	m355	9.34	m349	9.09	29.9	0.8	189.5
q347	m356	9.42	m355	9.34	12.6	0.6	189.5
q348	m357	9.24	m351	9.03	31.2	0.7	189.5
q349	m358	9.39	m357	9.24	14.3	1	189.5
q350	m359	9.35	m61	9.23	29.9	0.4	189.5
q351	m360	9.45	m359	9.35	26.2	0.4	189.5
q352	m361	9.66	m64	9.54	30	0.4	189.5
q353	m362	9.78	m361	9.66	29.2	0.4	189.5
q354	m363	9.9	m362	9.78	12.4	0.9	189.5
q355	m364	9.9	m362	9.78	30.4	0.4	189.5
q356	m365	9.28	m67	9.16	30	0.4	189.5
q357	m366	9.31	m365	9.28	8.3	0.4	189.5
q358	m367	9.42	m366	9.31	25.4	0.4	189.5
q359	m368	9.62	m366	9.5	29.8	0.4	189.5
q360	m369	9.77	m368	9.62	28.4	0.5	189.5
q362	m370	9.38	m371	9.1	30	0.9	189.5
q363	m371	9.1	m372	8.98	30	0.4	189.5
q364	m372	8.98	m373	8.86	30	0.4	189.5
q365	m373	8.86	m374	8.76	24.7	0.4	189.5
q367	m376	9.33	m375	9.21	30	0.4	189.5
q368	m377	9.45	m376	9.33	29.5	0.4	189.5
q369	m378	9.52	m377	9.45	16.4	0.4	189.5
q370	m374	8.76	m379	8.72	9	0.4	189.5
q371	m380	9.52	m379	9.34	18.2	1	189.5
q372	m379	8.72	m381	8.62	25.8	0.4	189.5
q373	m381	8.62	m382	8.54	19	0.4	189.5
q374	m382	8.54	m383	8.5	11	0.4	189.5
q375	m383	8.5	m384	8.42	20.6	0.4	189.5
q376	m384	8.42	m385	8.4	4.6	0.4	189.5
q377	m386	8.52	m385	8.47	12.5	0.4	189.5
q378	m387	8.64	m386	8.52	30	0.4	189.5
q379	m388	8.76	m387	8.64	30	0.4	189.5
q383	m392	9.16	m391	9.09	10	0.7	189.5
q386	m394	9.08	m382	8.96	29.7	0.4	189.5
q388	m385	8.4	m396	8.33	16.9	0.3	189.7
q389	m396	8.33	m397	8.24	30	0.3	189.7
q392	m400	8.8	m399	8.68	29.9	0.4	189.5
q393	m401	8.95	m400	8.8	30	0.5	189.5
q394	m402	9.13	m401	8.95	24.6	0.7	189.5
q395	m403	8.54	m24	8.42	30	0.4	189.5
q396	m404	8.66	m403	8.54	30	0.4	189.5
q397	m405	8.78	m404	8.66	30	0.4	189.5
q398	m406	8.9	m405	8.78	28.2	0.4	189.5
q401	m409	9.27	m408	9.2	16.5	0.4	189.5
q402	m410	9.15	m408	9.03	26.7	0.4	189.5
q403	m411	9.24	m410	9.15	22.5	0.4	189.5
q404	m412	9.5	m411	9.43	17.2	0.4	189.5
q405	m413	9.31	m411	9.24	17.5	0.4	189.5
q408	m416	9.1	m415	9.03	11	0.7	189.5

q409	m417	8.79	m21	8.67	30	0.4	189.5
q410	m418	8.91	m417	8.79	30	0.4	189.5
q411	m419	9.05	m418	8.91	34.7	0.4	189.5
q412	m420	8.58	m18	8.46	30.7	0.4	189.5
q414	m421	8.7	m420	8.58	29.2	0.4	189.5
q415	m422	8.82	m421	8.7	30	0.4	189.5
q416	m423	8.94	m422	8.82	30	0.4	189.5
q417	m424	9	m423	8.94	8.9	0.6	189.5
q418	m425	8.01	m14	7.89	29.9	0.4	189.5
q419	m426	8.13	m425	8.01	30	0.4	189.5
q420	m427	8.25	m426	8.13	30	0.4	189.5
q421	m428	8.37	m427	8.25	30	0.4	189.5
q424	m431	8.61	m430	8.5	26.5	0.4	189.5
q425	m432	8.73	m431	8.61	30	0.4	189.5
q427	m434	9.15	m433	8.97	30	0.6	189.5
q432	m439	8.89	m438	8.79	28.4	0.4	189.5
q433	m440	8.77	m430	8.5	29.9	0.9	189.5
q434	m441	8.9	m440	8.77	30	0.4	189.5
q435	m442	9.04	m441	8.9	23.7	0.6	189.5
q437	m443	7.92	m444	7.8	30	0.4	189.5
q438	m444	7.8	m445	7.78	7.1	0.4	189.5
q439	m446	7.85	m445	7.78	7.5	0.9	189.7
q441	m447	9.36	m448	9.31	13.1	0.4	189.5
q442	m448	9	m449	8.92	20.1	0.4	189.5
q443	m449	8.76	m450	8.65	26.8	0.4	189.5
q444	m450	8.65	m451	8.53	30	0.4	189.5
q445	m451	8.53	m452	8.41	30	0.4	189.5
q446	m452	8.41	m453	8.29	30	0.4	189.5
q447	m453	8.29	m81	8.27	9.6	0.4	189.5
q449	m454	9.12	m448	9	30	0.4	189.5
q450	m455	9.18	m454	9.12	15.4	0.4	189.5
q451	m399	8.13	m456	8.04	26.9	0.3	189.7
q452	m456	8.04	m457	7.94	30	0.3	189.7
q453	m457	7.94	m446	7.85	27.8	0.3	189.7
q454	m445	7.78	m458	7.7	22.4	0.3	189.7
q455	m458	7.7	m459	7.66	14.6	0.3	189.7
q456	m460	8.62	m459	8.5	31.4	0.4	189.5
q457	m461	8.66	m460	8.62	11.2	0.4	189.5
q458	m462	8.88	m449	8.76	30	0.4	189.5
q459	m463	9	m462	8.88	30	0.4	189.5
q460	m464	9.12	m463	9	31.6	0.4	189.5
q462	m459	7.66	m465	7.6	15.5	0.3	189.7
q463	m465	7.6	m466	7.5	30	0.3	189.7
q464	m466	7.5	m467	7.41	30	0.3	189.7
q465	m467	7.41	m468	7.31	30	0.3	189.7
q466	m468	7.31	m469	7.28	7.6	0.3	189.7
q467	m470	8.53	m469	8.41	29.9	0.4	189.5
q468	m471	8.63	m470	8.53	26.6	0.4	189.5
q470	m472	7.22	m9	7.1	28.5	0.4	189.5
q471	m473	7.34	m472	7.22	30	0.4	189.5

q472	m474	7.46	m473	7.34	30	0.4	189.5
q473	m475	7.58	m474	7.46	30	0.4	189.5
q474	m476	7.7	m475	7.58	30	0.4	189.5
q475	m477	7.83	m476	7.7	31	0.4	189.5
q476	m478	7.94	m477	7.83	29	0.4	189.5
q477	m479	8.04	m478	7.94	24.6	0.4	189.5
q478	m480	8.25	m479	8.22	5.4	0.4	189.5
q479	m481	8.37	m480	8.25	30	0.4	189.5
q480	m482	8.43	m481	8.37	15.4	0.4	189.5
q481	m483	9.12	m482	9.06	14.6	0.4	189.5
q483	m485	8.55	m482	8.43	30	0.4	189.5
q484	m486	8.67	m485	8.55	30	0.4	189.5
q486	m488	8.94	m487	8.79	39	0.4	189.5
q487	m489	8.46	m477	8.34	29.9	0.4	189.5
q488	m490	8.58	m489	8.46	29.4	0.4	189.5
q489	m491	8.16	m479	8.04	30	0.4	189.5
q490	m492	8.28	m491	8.16	30	0.4	189.5
q492	m469	7.28	m494	7.21	22.4	0.3	189.7
q493	m494	7.21	m495	7.11	30	0.3	189.7
q494	m495	7.11	m484	7.02	27.3	0.3	189.7
q495	m484	7.02	m496	6.94	24.1	0.3	189.7
q496	m496	6.94	m497	6.81	37.8	0.3	189.7
q497	m497	6.81	m498	6.71	30.7	0.3	189.7
q498	m498	6.71	m499	6.61	30	0.3	189.7
q499	m499	6.61	m500	6.54	21.1	0.3	189.7
q500	m501	7.77	m496	7.65	30	0.4	189.5
q501	m502	7.89	m501	7.77	29.9	0.4	189.5
q502	m503	7.96	m502	7.89	17.9	0.4	189.5
q506	m507	8.4	m506	8.23	20.8	0.8	189.5
q507	m508	8.37	m506	8.23	36.9	0.4	189.5
q508	m509	8.26	m503	7.96	31.5	0.9	189.5
q511	m511	5.18	m510	5.01	30	0.5	189.7
q512	m512	5.28	m511	5.18	30	0.3	189.7
q513	m513	5.38	m512	5.28	30	0.3	189.7
q514	m514	5.47	m513	5.38	30	0.3	189.7
q515	m515	5.57	m514	5.47	29.9	0.3	189.7
q517	m517	7.65	m6	7.53	30	0.4	189.5
q518	m518	7.72	m517	7.65	17.6	0.4	189.5
q519	m519	5.77	m516	5.67	30.8	0.3	189.7
q520	m520	5.87	m519	5.77	28.3	0.3	189.7
q521	m521	5.91	m520	5.87	13.1	0.3	189.7
q522	m522	5.97	m521	5.91	17.5	0.3	189.7
q523	m523	6.04	m522	5.97	22.4	0.3	189.7
q526	m526	6.17	m525	6.07	28.6	0.3	189.7
q527	m527	6.26	m526	6.17	30	0.3	189.7
q528	m528	6.36	m527	6.26	30.7	0.3	189.7
q529	m500	6.54	m529	6.46	23.6	0.3	189.7
q533	m533	7.48	m534	7.41	15.8	0.4	189.5
q534	m534	7.41	m535	7.36	14.2	0.4	189.5
q535	m535	7.36	m536	7.29	17.8	0.4	189.5

q536	m536	7.29	m537	7.25	10	0.3	189.7
q539	m539	7.15	m540	7.05	30	0.3	189.7
q540	m540	7.05	m541	6.98	21.2	0.3	189.7
q541	m541	6.98	m98	6.97	3.3	0.3	189.7
q542	m542	8.36	m536	8.24	29.7	0.4	189.5
q544	m544	8.6	m543	8.48	30	0.4	189.5
q547	m547	9.06	m546	9	16.5	0.4	189.5
q548	m548	9.04	m534	8.92	29.9	0.4	189.5
q549	m549	9.16	m548	9.04	29.9	0.4	189.5
q550	m550	9.26	m549	9.16	22.9	0.4	189.5
q551	m551	8.36	m537	8.24	30	0.4	189.5
q552	m552	8.45	m551	8.36	21.4	0.4	189.5
q553	m553	7.61	m525	7.49	29.4	0.4	189.5
q554	m554	7.85	m531	7.74	25.6	0.4	189.5
q556	m557	9.23	m556	9.16	17.7	0.4	189.5
q558	m558	9.45	m559	9.29	30	0.5	189.5
q559	m559	9.29	m560	8.99	30	1	189.5
q562	m562	8.68	m563	8.44	27.2	0.9	189.5
q563	m563	8.44	m564	8.27	30	0.5	189.5
q564	m564	8.09	m107	7.79	30	1	189.5
q565	m565	9.33	m557	9.23	24.9	0.4	189.5
q566	m566	8.81	m562	8.68	30	0.4	189.5
q567	m567	8.84	m566	8.81	8.1	0.4	189.5
q569	m529	6.46	m528	6.36	29.3	0.3	189.7
q570	m570	7.12	m115	6.82	29.9	1	189.5
q571	m571	7.36	m570	7.12	30	0.8	189.5
q572	m572	7.57	m571	7.36	30	0.7	189.5
q573	m573	7.87	m572	7.57	30	1	189.5
q574	m574	8.2	m573	7.97	30	0.8	189.5
q575	m575	8.49	m574	8.2	30	1	189.5
q577	m577	8.88	m576	8.76	30	0.4	189.5
q578	m578	8.89	m577	8.88	2.5	0.4	189.5
q579	m579	8.98	m578	8.89	22.2	0.4	189.5
q580	m580	9.14	m578	8.89	30	0.8	189.5
q584	m584	6.87	m583	6.62	30	0.8	189.5
q585	m585	6.95	m584	6.87	7.7	1	189.5
q588	m587	9.08	m588	8.86	30	0.7	189.5
q589	m588	8.86	m589	8.74	30	0.4	189.5
q590	m589	8.74	m590	8.62	30	0.4	189.5
q591	m590	8.62	m591	8.5	29.3	0.4	189.5
q592	m591	8.09	m592	7.97	30.7	0.4	189.5
q593	m592	7.97	m554	7.85	30	0.4	189.5
q594	m586	9.03	m593	8.91	25.9	0.4	189.5
q596	m594	8.79	m595	8.67	30	0.4	189.5
q597	m595	8.67	m596	8.55	30	0.4	189.5
q598	m596	8.55	m597	8.5	13	0.4	189.5
q601	m599	8.31	m600	8.19	30.1	0.4	189.5
q602	m600	8.19	m601	8.07	30	0.4	189.5
q603	m601	8.07	m602	7.95	30	0.4	189.5
q605	m603	7.83	m604	7.71	30	0.4	189.5

q607	m605	2.42	m606	2.39	30	0.1	470.5
q608	m606	2.39	m607	2.36	30	0.1	470.5
q611	m609	2.3	m610	2.27	29.8	0.1	470.5
q612	m610	2.27	m611	2.24	30	0.1	470.5
q615	m124	1.18	m613	1.17	13.8	0.1	470.5
q616	m613	1.17	m614	1.16	12	0.1	470.5
q617	m614	1.16	m615	1.13	30	0.1	470.5
q618	m615	1.13	m616	1.1	29.9	0.1	470.5
q619	m616	1.1	m617	1.07	34.1	0.1	470.5
CO-115	n291	7.24	m521	7.12	30	0.4	189.5
CO-116	n296	8	m523	7.87	29.9	0.4	189.5
CO-117	n510	8.21	m591	8.09	29.9	0.4	189.5
CO-119	n505	8.98	m599	8.85	29.9	0.4	189.5
q604(1)	m602	7.95	MH-20	7.86	22.5	0.4	189.5
q604(2)	MH-20	7.86	m603	7.83	7.5	0.4	189.5
CO-120	n516	8.88	MH-20	8.52	35.1	1	189.5
CO-121	m604	7.71	MH-21	7.63	20.9	0.4	189.5
CO-122	MH-21	2.43	m605	2.42	9	0.1	470.5
q609(1)	m607	2.36	MH-22	2.34	14.7	0.1	470.5
q609(2)	MH-22	2.34	m608	2.33	15.3	0.1	470.5
CO-123	n437	5.99	MH-22	5.86	30.4	0.4	189.5
CO-124	n228	2.43	MH-21	2.43	6.1	0.1	470.5
CO-154	m393	9.43	MH-38	9.29	14.6	1	189.5
CO-155	MH-38	9.29	m391	9.09	20.8	1	189.5
CO-156	MH-39	9.13	m394	9.08	11.3	0.4	189.5
CO-157	MH-40	9.14	MH-39	9.13	4.2	0.4	189.5
CO-158	m395	9.23	MH-40	9.14	20.1	0.4	189.5
CO-164	MH-44	8.19	m256	8.13	13.7	0.4	189.5
CO-165	m258	8.28	MH-44	8.19	23	0.4	189.5
CO-166	MH-45	8	m248	7.96	9.6	0.4	189.5
CO-167	m249	8.06	MH-45	8	14.7	0.4	189.5
CO-168	MH-46	8.29	m269	8.24	13.5	0.4	189.5
CO-169	m270	8.35	MH-46	8.29	14.8	0.4	189.5
CO-170	m252	8.32	MH-48	8.26	16.6	0.4	189.5
CO-171	MH-48	8.26	MH-47	8.16	24.9	0.4	189.5
CO-172	MH-47	8.16	m249	8.06	25	0.4	189.5
CO-173	m487	8.79	MH-50	8.71	19.1	0.4	189.5
CO-174	MH-50	8.71	m486	8.67	11.1	0.4	189.5
CO-175	MH-51	8.94	m432	8.73	23.9	0.9	189.5
CO-178	m438	8.36	m437	8.1	26.8	1	189.5
CO-182	m435	8.16	m437	8.03	33.1	0.4	189.5
CO-186	m506	8.23	MH-57	8.16	15.4	0.4	189.5
CO-187	m493	8.4	MH-60	8.32	20.8	0.4	189.5
CO-188	MH-60	8.32	m492	8.28	9.5	0.4	189.5
CO-189	MH-61	5.59	m265	5.53	14.7	0.4	189.5
CO-190	m266	5.64	MH-61	5.59	14.4	0.4	189.5
CO-191	MH-63	5.7	m266	5.64	13.8	0.4	189.5
CO-192	m267	5.76	MH-63	5.7	16.2	0.4	189.5
CO-193	m231	9.29	MH-64	9.14	36	0.4	189.5
CO-194	MH-64	9.14	m233	9.05	23.4	0.4	189.5

CO-195	m233	9.05	MH-65	8.95	19.7	0.5	189.5
CO-196	MH-65	8.95	m235	8.85	24	0.4	189.5
CO-199	m302	5.91	MH-69	5.87	11.3	0.4	189.5
CO-201	MH-69	5.87	m296	5.79	20.1	0.4	189.5
CO-204	MH-70	6.67	m304	6.58	22	0.4	189.5
CO-207	m317	6.63	MH-74	6.55	8.5	1	189.5
CO-208	MH-74	6.55	m316	6.45	22.9	0.4	189.5
CO-211	m319	4.07	MH-76	3.7	36.9	1	189.5
CO-212	MH-77	1.86	m328	1.76	26.1	0.4	189.5
CO-213	m329	1.88	MH-77	1.86	3.8	0.4	189.5
CO-214	n24	3.72	MH-78	3.67	30	0.2	299.5
CO-221	m576	8.76	MH-81	8.7	14.8	0.4	189.5
CO-222	MH-81	8.7	m575	8.56	15.2	0.9	189.5
q595(1)	m593	8.91	MH-83	8.82	26.1	0.4	189.5
q595(2)	MH-83	8.82	m594	8.79	8	0.4	189.5
CO-226	n328	8.99	MH-85	8.88	26.9	0.4	189.5
CO-227	MH-86	8.66	m544	8.6	16	0.4	189.5
CO-228	m545	8.72	MH-86	8.66	13.5	0.4	189.5
CO-231	MH-89	8.95	m545	8.72	23.3	1	189.5
CO-233	MH-90	9.12	m374	9.09	8.9	0.4	189.5
CO-234	m375	9.21	MH-90	9.12	21.1	0.4	189.5
q29(1)	MH-91	7.42	m29	7.33	23.2	0.4	189.5
q361(2)	MH-92	9.56	m370	9.38	24.4	0.7	189.5
CO-235	m349	8.59	m347	8.44	37.1	0.4	189.5
CO-237	m31	7.53	MH-91	7.42	26.8	0.4	189.5
q345(1)	MH-93	9.1	m354	9.04	15.1	0.4	189.5
q132(1)	m145	7.63	MH-94	7.55	20.3	0.4	189.5
q219(1)	MH-95	9.17	m230	8.93	24.2	1	189.5
CO-240	MH-96	5.51	m299	5.45	14.8	0.4	189.5
CO-241	m300	5.56	MH-96	5.51	11.9	0.4	189.5
CO-242	m298	5.33	MH-97	5.25	20.8	0.4	189.5
q300(2)	MH-99	7.26	m310	7.17	20.6	0.4	189.5
q532(1)	m532	7.6	MH-102	7.51	22.8	0.4	189.5
q440(2)	MH-103	9.54	m447	9.36	19.9	0.9	189.5
q384(1)	MH-104	9.34	m392	9.16	24.9	0.7	189.5
q428(2)	MH-105	8.37	m435	8.16	20.6	1	189.5
q482(1)	MH-106	9.29	m483	9.12	24.9	0.7	189.5
CO-249	MH-107	2.21	m124	2.2	10.6	0.1	470.5
CO-250	m583	6.62	MH-108	6.46	15.3	1	189.5
CO-251	MH-108	6.46	MH-109	6.42	11.1	0.4	189.5
CO-252	MH-109	6.12	m119	5.79	33.1	1	189.5
CO-253	m117	2.87	m119	2.82	30.8	0.2	299.5
CO-254	m581	8.45	m599	8.31	34.5	0.4	189.5
CO-255	m597	8.5	m581	8.45	12.3	0.4	189.5
CO-257	MH-110	9.23	m580	9.14	23.9	0.4	189.5
CO-258	n5	4.78	n6	4.7	31.5	0.2	236.1
CO-260	MH-112	7.8	n292	7.35	44.7	1	189.5
CO-261	MH-113	9.02	m500	8.78	24.8	1	189.5
CO-262	n192	2.64	n193	2.63	5.9	0.1	470.5
CO-38(1)	MH-115	9.22	n196	8.92	30.2	1	189.5

CO-264	n300	7.06	MH-18	6.94	30	0.4	189.5
CO-266	n161	6.59	MH-10	6.58	5.6	0.3	189.7
CO-267	MH-117	8.33	n305	8.21	29.2	0.4	189.5
CO-268	n322	7.66	n323	7.52	35.2	0.4	189.5
p425(1)	MH-118	7.7	n322	7.66	8.5	0.4	189.5
p425(2)	n413	7.78	MH-118	7.7	20.5	0.4	189.5
p335(1)	MH-119	8.77	n321	8.57	19.7	1	189.5
CO-273	MH-84	9.07	MH-83	8.98	23.3	0.4	189.5
CO-275	n506	9.19	MH-84	9.07	29.2	0.4	189.5
CO-276	MH-76	3.01	m328	2.86	15.3	1	189.5
CO-277	m307	6.7	MH-70	6.67	7.6	0.4	189.5
CO-278	m546	9	MH-89	8.95	7.1	0.7	189.5
CO-279	MH-120	8.44	m542	8.36	20.4	0.4	189.5
CO-280	m543	8.48	MH-120	8.44	9.5	0.4	189.5
CO-281	m433	8.97	MH-51	8.94	6.8	0.4	189.5
CO-282	m430	8.5	m428	8.37	33.4	0.4	189.5
CO-283	n167	6.96	n165	6.87	21.3	0.4	189.5
CO-285	n158	6.3	MH-121	6.19	33.5	0.3	189.7
CO-286	MH-121	6.19	n155	6.13	18	0.3	189.7
CO-287	n150	5.7	MH-122	5.68	8.3	0.3	189.7
CO-288	MH-122	5.68	n149	5.63	15.5	0.3	189.7
CO-289	n408	8.52	MH-123	8.41	14.8	0.7	189.5
CO-290	MH-123	8.41	n406	8.39	5.2	0.4	189.5
CO-291	n403	8.2	MH-124	8.16	8.9	0.4	189.5
CO-292	MH-124	8.16	n402	8.08	20.5	0.4	189.5
CO-293	n399	7.72	n189	7.68	9	0.4	189.5
CO-294	MH-11	6.59	n63	6.54	12.1	0.4	189.5
CO-296	n103	7.4	n57	7.25	30	0.5	189.5
CO-297	n112	7.34	MH-125	7.31	6.6	0.4	189.5
CO-298	MH-125	7.31	n113	7.26	14.5	0.4	189.5
CO-300	MH-126	6.31	n125	6.29	3.7	0.4	189.5
CO-301	n128	6.41	MH-126	6.31	26.2	0.4	189.5
CO-303	n331	6.31	n339	6.26	15.7	0.3	189.7
CO-304	m6	5.46	m4	5.36	31.6	0.3	189.7
CO-305	m21	6.56	m18	6.44	36.7	0.3	189.7
CO-306	n473	6.76	n471	6.62	35.1	0.4	189.5
CO-307	m525	6.07	m523	6.04	9	0.3	189.7
CO-308	MH-116	8.85	n199	8.44	42.8	1	189.5
CO-309	m408	9.03	m406	8.9	33.4	0.4	189.5
CO-310	m397	8.24	m399	8.13	33.1	0.3	189.7
CO-312	MH-57	8.16	MH-128	8.15	2.9	0.4	189.5
CO-313	MH-128	8.15	MH-59	8.1	13	0.4	189.5
CO-315	m306	6.25	m304	6.15	24.8	0.4	189.5
CO-316	m341	6.62	m339	6.56	15.7	0.4	189.5
CO-317	m175	7.99	m182	7.87	30.9	0.4	189.5
CO-318	m255	8.7	m253	8.36	34.7	1	189.5
CO-319	m272	7.87	m96	7.61	33.8	0.8	189.5
CO-320	m91	4.39	m93	4.29	32.1	0.3	189.7
CO-321	m79	6.61	m81	6.58	8.7	0.3	189.7
CO-322	m64	7.64	m66	7.5	34.4	0.4	189.5

CO-323	m560	8.99	m562	8.68	32.8	0.9	189.5
CO-324	m537	7.25	m539	7.15	32.1	0.3	189.7
CO-325	MH-49	5.76	m283	5.59	17.2	1	189.5
CO-326	m284	6.22	MH-49	6.2	5.6	0.4	189.5
CO-327	n279	5.63	m515	5.57	16.6	0.3	189.7
CO-328	m516	5.67	n279	5.63	13.2	0.3	189.7
CO-329	n374	7.58	n372	7.43	36.6	0.4	189.5
CO-330	MH-129	8.09	n388	8.03	6.3	0.9	189.5
CO-331	n389	8.18	MH-129	8.09	23.7	0.4	189.5
CO-333	MH-59	8.1	m503	7.96	35.6	0.4	189.5
CO-334	m510	4.97	n3	4.93	16.5	0.2	236.1
CO-335	m2	5.16	m510	5.01	43.5	0.3	189.7
CO-336	n205	7.75	n207	7.72	5.3	0.4	189.5
CO-269(1)	MH-130	8.91	m388	8.76	37	0.4	189.5
CO-339	m415	9.03	MH-130	8.91	29.8	0.4	189.5
CO-340	m391	9.09	MH-130	9.03	13	0.4	189.5
CO-341	m437	8.03	MH-54	8.01	4.1	0.4	189.5
CO-342	MH-54	8.01	m443	7.92	22.4	0.4	189.5
CO-344	MH-102	7.51	m533	7.48	7.2	0.4	189.5
CO-346	m531	7.74	m532	7.6	37	0.4	189.5
CO-347	MH-132	9.23	n329	9.11	30.2	0.4	189.5
CO-348	MH-134	9.05	n427	8.91	21.1	0.7	189.5
CO-263(1)	MH-135	8.59	n497	8.52	6.6	1	189.5
CO-350	n197	8.87	MH-116	8.85	4	0.4	189.5
CO-351	m556	9.16	m586	9.03	32.4	0.4	189.5
q587(2)	MH-136	9.24	m587	9.08	19.3	0.8	189.5
CO-355	MH-97	5.25	m103	5.21	9.2	0.4	189.5
CO-356	MH-94	7.55	m70	7.51	9.7	0.4	189.5
CO-357	m173	8.33	m174	8.3	7.5	0.4	189.5
CO-359	n187	2.85	n188	2.82	22.4	0.1	377.9
CO-360	n191	2.67	n192	2.64	27.9	0.1	470.5
CO-361	m608	2.33	m609	2.3	30	0.1	470.5
CO-362	m611	2.24	MH-107	2.21	23.6	0.1	470.5
CO-363	n142	3.11	MH-1	3.08	24.2	0.1	377.9
CO-364	n143	3.15	n142	3.11	30	0.1	377.9
CO-365	MH-1	3.08	n140	3.04	35.8	0.1	377.9
CO-366	n132	5.02	n133	4.99	8.4	0.3	189.7
CO-368	n62	6.65	MH-11	6.59	16.8	0.4	189.5
CO-372	m617	1.07	m618	0.97	17.4	0.6	470.5
CO-373	m618	0.97	m620	0.92	10.3	0.5	470.5
CO-374	m620	0.92	O-3	0.9	18.9	0.1	470.5
CO-376	n140	3.04	n138	3	33	0.1	377.9
CO-378	MH-144	4.16	n29	4.13	7.1	0.4	189.5

JUNCTION NODE DETAILS				
NODE ID	**ELEVATION (Ground) (m)**	**ELEVATION (Invert) (m)**	**Depth**	**INFLOWS**
n3	8.66	4.93	5.04	15.98
n4	8.34	4.85	4.97	16.05
n5	8.38	4.78	4.89	16.13
n6	8.47	4.63	4.77	21.75
n7	8.34	4.59	4.72	21.82
n8	8.57	4.53	4.67	21.9
n9	8.86	4.48	4.62	21.97
n10	8.87	4.43	4.57	22.05
n11	9	4.38	4.52	22.13
n12	9.1	4.34	4.48	22.42
n13	9.17	4.28	4.42	22.5
n14	9.26	4.23	4.37	22.58
n15	9.36	4.18	4.32	22.65
n16	9.33	4.13	4.27	22.73
n17	9.32	4.08	4.22	23.78
n18	9.32	4.02	4.17	23.85
n19	9.29	3.97	4.12	23.93
n20	9.27	3.92	4.07	24
n21	8.99	3.87	4.02	24.07
n22	8.76	3.82	3.96	24.15
n23	8.54	3.77	3.91	24.23
n24	8.44	3.72	3.86	24.3
n26	8.39	3.62	3.77	24.83
n27	8.26	3.57	3.71	24.9
n28	8.2	3.51	3.66	24.98
n29	8.19	3.4	3.55	26.85
n31	8.11	4.28	4.31	1.73
n32	7.91	4.4	4.43	1.65
n33	7.93	4.52	4.55	1.57
n34	7.97	4.64	4.67	1.5
n35	7.96	4.76	4.79	1.43
n36	7.85	4.88	4.91	1.35
n37	7.73	5	5.03	1.28
n38	7.63	5.12	5.15	1.2
n39	7.61	5.24	5.27	1.12
n40	7.54	5.36	5.39	1.05
n41	7.39	5.48	5.5	0.97
n42	7.28	5.6	5.62	0.9
n43	7.13	5.72	5.73	0.15
n44	7.03	5.84	5.85	0.07
n57	8.44	7.25	7.27	0.3
n58	8.73	7.13	7.15	0.37
n59	8.96	7.01	7.03	0.45
n60	9.23	6.89	6.91	0.52
n61	9.56	6.77	6.79	0.6

n62	9.68	6.65	6.68	0.68
n63	9.05	6.54	6.56	0.82
n64	8.62	6.42	6.44	0.9
n65	8.25	6.3	6.32	0.97
n66	8.27	6.27	6.3	1.5
n67	8.45	6.06	6.09	1.57
n68	8.68	5.94	5.97	1.65
n69	9.05	5.82	5.85	1.73
n70	9.41	5.7	5.73	1.8
n71	9.53	5.67	5.71	3.07
n72	9.47	5.6	5.65	3.75
n74	9.47	5.5	5.55	3.82
n75	9.2	5.4	5.45	4.2
n77	9.25	7.49	7.5	0.3
n79	9.13	7.53	7.54	0.23
n80	8.91	7.61	7.62	0.15
n81	8.91	7.73	7.73	0.07
n82	8.53	7.34	7.35	0.07
n83	8.66	7.3	7.31	0.15
n84	8.49	7.18	7.19	0.23
n86	8.32	6.56	6.58	0.75
n87	8.29	6.34	6.37	1.28
n88	8.18	6.3	6.33	1.35
n89	8.22	6.18	6.21	1.43
n90	8.19	6.06	6.09	1.5
n91	8.14	5.94	5.97	1.57
n92	8.19	5.82	5.85	1.65
n93	8.26	5.75	5.8	2.32
n94	8.14	5.71	5.75	2.4
n96	8.17	5.61	5.65	2.63
n97	8.06	5.58	5.63	2.7
n98	8.12	3.22	3.38	29.93
n99	8.17	3.25	3.41	27.15
n100	8.08	3.29	3.44	27.08
n101	8.2	3.33	3.48	27
n102	8	3.36	3.51	26.92
n103	8.63	7.4	7.41	0.23
n104	8.71	7.52	7.53	0.15
n105	8.89	7.7	7.71	0.07
n106	8.39	7.2	7.21	0.07
n107	8.41	7.16	7.17	0.15
n108	8.26	7.04	7.05	0.23
n109	8.23	6.92	6.93	0.3
n110	8.31	6.8	6.81	0.37
n111	8.27	6.68	6.7	0.45
n112	8.53	7.34	7.35	0.07
n113	8.55	7.26	7.27	0.23
n114	8.68	7.14	7.15	0.3
n115	8.71	7.02	7.03	0.37
n116	8.43	6.9	6.91	0.45

n117	7.95	6.69	6.7	0.07
n118	7.82	6.63	6.64	0.15
n119	7.94	6.47	6.49	0.37
n122	7.19	5.99	6.01	0.6
n123	7.32	6.11	6.12	0.52
n124	7.54	6.23	6.24	0.45
n125	7.61	6.29	6.31	0.37
n126	7.76	6.54	6.55	0.07
n127	7.65	6.46	6.46	0.07
n128	7.66	6.41	6.42	0.15
n129	9.37	5.32	5.37	4.28
n130	9.59	5.22	5.28	4.35
n131	9.52	5.12	5.18	4.43
n132	9.56	5.02	5.08	4.5
n133	9.51	4.99	5.05	4.58
n134	9.48	4.92	4.98	4.65
n135	9.58	4.82	4.88	4.73
n136	9.41	4.72	4.78	4.8
n137	9.24	4.62	4.69	4.87
n138	9.15	3	3.18	39.22
n140	8.89	3.04	3.21	34.28
n142	8.66	3.11	3.28	30.15
n143	8.52	3.15	3.31	30.07
n144	8.32	3.18	3.34	30
n147	8.58	5.5	5.56	3.98
n148	8.21	5.6	5.66	3.9
n149	8.23	5.63	5.68	3.82
n150	8.14	5.7	5.75	3.22
n151	8.09	5.8	5.85	3.15
n152	8.09	5.9	5.95	3.07
n153	8.09	6	6.05	3
n154	8.21	6.1	6.15	2.92
n155	8.2	6.13	6.17	2.85
n158	8.47	6.3	6.34	2.7
n159	8.81	6.4	6.44	2.63
n160	9.2	6.49	6.54	2.55
n161	9.53	6.59	6.64	2.4
n164	9.85	6.8	6.84	2.25
n165	10.09	6.87	6.91	2.02
n167	10.13	6.96	6.99	1.95
n168	9.89	8.7	8.71	0.15
n169	9.91	8.58	8.6	0.23
n170	9.95	8.52	8.53	0.37
n172	8.13	6.86	6.88	0.6
n173	8.14	6.94	6.96	0.52
n174	8.22	7.03	7.05	0.45
n176	8.27	7.06	7.07	0.37
n179	8.31	7.12	7.13	0.3
n180	8.36	7.16	7.17	0.23
n183	8.84	7.65	7.65	0.07

n184	9.29	2.97	3.15	39.3
n185	9.5	2.93	3.12	39.37
n186	9.68	2.86	3.04	39.83
n187	9.79	2.85	3.03	39.9
n188	10	2.82	2.99	39.98
n189	10.03	2.72	2.9	41.03
n190	10.18	2.7	2.88	41.1
n191	10.4	2.67	2.85	41.18
n192	10.38	2.64	2.82	41.25
n193	10.35	2.63	2.81	41.32
n196	10.11	8.92	8.93	0.15
n197	10.09	8.87	8.88	0.23
n199	9.63	8.44	8.45	0.37
n200	9.48	8.29	8.3	0.45
n201	9.38	8.19	8.21	0.52
n202	9.35	8.14	8.16	0.6
n204	9.3	8.11	8.13	0.68
n205	8.93	7.74	7.77	0.75
n207	8.95	7.39	7.41	0.97
n208	8.71	7.28	7.31	1.05
n209	8.66	7.16	7.19	1.12
n210	8.28	7.04	7.07	1.2
n211	8.26	7.03	7.06	1.28
n212	8.41	7.01	7.05	1.35
n213	8.64	6.92	6.95	1.43
n214	8.62	6.8	6.83	1.5
n215	8.76	6.75	6.78	1.57
n217	8.82	6.68	6.71	1.65
n218	8.85	6.56	6.6	1.73
n219	8.85	6.51	6.55	2.02
n220	8.79	6.44	6.48	2.1
n221	8.85	6.34	6.38	2.17
n222	8.98	6.24	6.28	2.25
n223	9.14	6.18	6.22	2.32
n224	9.12	6.14	6.19	2.4
n225	9.22	2.49	2.68	44.1
n227	8.95	2.46	2.65	44.18
n228	8.8	2.43	2.62	44.25
n279	8.35	5.63	5.71	7.65
n286	8.58	7.26	7.27	0.23
n288	8.72	7.53	7.54	0.15
n289	8.81	7.62	7.63	0.07
n291	8.51	7.24	7.25	0.23
n292	8.54	7.35	7.36	0.15
n295	9.28	8.09	8.09	0.07
n296	9.21	8	8.01	0.15
n300	9.42	7.06	7.08	0.9
n301	9.42	7.18	7.2	0.82
n302	9.49	7.3	7.32	0.75
n303	9.38	7.39	7.41	0.68

n304	9.39	7.78	7.79	0.45
n305	9.43	7.87	7.88	0.37
n308	9.01	7.51	7.52	0.15
n309	8.8	7.61	7.62	0.07
n311	9.26	7.99	8	0.23
n312	9.3	8.11	8.12	0.15
n313	9.35	8.16	8.17	0.07
n314	10.01	7.03	7.07	1.88
n316	10.13	7.16	7.2	1.8
n317	10.25	7.8	7.82	0.6
n318	10.16	7.92	7.94	0.52
n319	9.9	8.04	8.06	0.45
n320	9.87	8.16	8.17	0.37
n321	9.76	8.57	8.58	0.15
n322	10	7.66	7.69	1.05
n323	9.98	7.52	7.55	1.12
n328	10.24	8.99	9	0.23
n329	10.34	9.11	9.12	0.15
n331	9.55	6.31	6.38	5.1
n332	9.4	8.17	8.18	0.15
n333	9.44	8.25	8.26	0.07
n334	8.34	5.87	5.93	5.55
n335	8.71	5.96	6.03	5.47
n336	9.15	6.06	6.13	5.4
n337	9.52	6.12	6.18	5.32
n338	9.61	6.16	6.23	5.25
n339	9.65	6.26	6.33	5.17
n341	9.68	6.36	6.42	4.87
n342	9.49	6.46	6.52	4.8
n343	9.31	6.49	6.55	4.73
n344	9.11	6.54	6.6	4.43
n346	9.03	6.66	6.71	3.53
n347	8.7	6.76	6.81	3.45
n349	8.6	6.86	6.9	3
n350	8.85	6.94	6.99	2.92
n351	8.94	6.95	7	2.63
n352	9.25	7.05	7.1	2.55
n353	9.67	7.15	7.2	2.48
n354	9.76	7.17	7.22	2.4
n355	9.84	7.21	7.25	2.32
n356	9.44	7.48	7.5	0.75
n357	9.51	7.6	7.62	0.68
n359	9.67	7.64	7.66	0.6
n361	9.8	8.46	8.48	0.23
n363	9.77	8.58	8.59	0.15
n366	9.44	8.03	8.04	0.23
n367	9.39	8.15	8.16	0.15
n368	9.46	8.27	8.28	0.07
n369	9.17	7.81	7.82	0.15
n370	9.31	8.12	8.12	0.07

n371	9	7.31	7.32	0.23
n372	8.81	7.43	7.44	0.15
n374	8.77	7.58	7.58	0.07
n375	9.56	8.27	8.29	0.15
n376	9.58	8.39	8.4	0.07
n377	9.66	7.4	7.43	1.12
n378	9.48	7.5	7.53	1.05
n379	9.7	8.38	8.39	0.3
n380	9.82	8.5	8.51	0.23
n381	9.76	8.55	8.56	0.15
n383	9.79	8.6	8.61	0.07
n384	9.44	7.52	7.55	0.68
n385	9.28	7.64	7.66	0.6
n386	9.25	7.76	7.78	0.52
n387	9.18	7.86	7.87	0.45
n388	9.22	8.03	8.04	0.23
n389	9.37	8.18	8.19	0.07
n390	9.23	7.98	7.99	0.15
n392	9.3	8.11	8.11	0.07
n393	8.5	7.31	7.33	0.45
n394	8.96	7.53	7.55	0.37
n395	9.18	7.65	7.66	0.3
n396	9.01	7.77	7.78	0.23
n397	9.08	7.89	7.9	0.15
n398	9.13	7.94	7.95	0.07
n399	10.08	7.72	7.74	0.97
n400	10.17	7.84	7.86	0.9
n401	10	7.96	7.98	0.82
n402	10.11	8.08	8.1	0.75
n403	10.29	8.2	8.22	0.6
n404	10.16	8.31	8.33	0.52
n405	10.04	8.32	8.33	0.3
n406	9.58	8.39	8.4	0.23
n408	9.71	8.52	8.52	0.07
n409	9.62	7.76	7.78	0.3
n410	9.43	7.88	7.89	0.23
n411	9.19	8	8.01	0.15
n412	9.31	8.12	8.12	0.07
n413	9.84	7.78	7.81	0.9
n414	9.96	7.9	7.92	0.82
n415	9.82	8.02	8.04	0.75
n417	9.98	8.14	8.16	0.68
n418	9.72	8.33	8.34	0.15
n419	9.6	8.41	8.42	0.07
n420	10.08	8.24	8.26	0.45
n421	9.87	8.36	8.37	0.15
n422	9.65	8.46	8.47	0.07
n424	10.4	9	9.01	0.23
n425	10.31	9.12	9.13	0.15
n426	10.44	9.25	9.26	0.07

n427	10.1	8.91	8.92	0.15
n429	8.08	6.89	6.9	0.07
n430	8.27	6.82	6.83	0.15
n431	8.37	6.7	6.72	0.23
n432	8.28	6.58	6.6	0.3
n433	8.47	6.46	6.48	0.37
n434	8.25	6.34	6.36	0.45
n435	8.53	6.22	6.24	0.52
n436	8.21	6.1	6.13	0.6
n437	7.96	5.98	6.01	0.68
n459	9.91	6.83	6.87	2.17
n460	10.05	6.85	6.89	2.1
n461	7.82	6.51	6.52	0.3
n462	10.01	8.13	8.15	0.6
n463	9.93	8.25	8.27	0.52
n464	10.09	8.37	8.39	0.45
n465	10.03	8.49	8.51	0.37
n466	9.89	8.61	8.62	0.3
n467	9.9	8.68	8.69	0.23
n468	9.97	8.78	8.79	0.07
n470	9.97	8.78	8.78	0.07
n471	9.79	6.62	6.65	1.2
n473	9.72	6.76	6.79	1.12
n474	9.39	6.86	6.87	0.23
n475	8.79	6.98	6.99	0.15
n476	8.28	7.09	7.1	0.07
n477	9.87	8.14	8.17	0.82
n478	10.01	8.26	8.29	0.75
n480	9.97	8.39	8.41	0.68
n481	10	8.45	8.47	0.45
n482	10.02	8.71	8.72	0.15
n483	10.02	8.83	8.84	0.07
n484	9.76	8.5	8.52	0.23
n485	9.83	8.62	8.63	0.15
n486	9.9	8.71	8.72	0.07
n487	9.28	7.51	7.52	0.15
n489	8.82	7.63	7.64	0.07
n490	10.15	8.96	8.97	0.15
n491	10.26	9.07	9.08	0.07
n492	9.79	8.3	8.32	0.37
n493	9.75	8.42	8.44	0.3
n494	9.79	8.54	8.55	0.23
n495	9.85	8.66	8.67	0.15
n496	9.9	8.71	8.71	0.07
n497	9.71	8.44	8.45	0.15
n498	9.33	7.96	7.97	0.23
n499	10.35	2.61	2.79	41.4
n500	10.14	2.58	2.76	41.47
n501	9.8	2.55	2.73	41.55
n502	9.45	2.52	2.7	41.62

n503	10.32	9.13	9.14	0.07
n504	10.46	9.09	9.11	0.15
n505	10.61	8.97	8.99	0.23
n506	10.38	9.19	9.19	0.07
n508	9.58	8.39	8.4	0.07
n509	9.6	8.33	8.34	0.15
n510	9.77	8.21	8.22	0.23
n511	7.93	6.11	6.13	0.37
n512	7.87	6.23	6.25	0.3
n513	7.77	6.35	6.37	0.23
n514	7.82	6.47	6.48	0.15
n515	7.75	6.56	6.57	0.07
n516	10.71	8.88	8.89	0.23
n517	10.76	9.41	9.42	0.15
n518	10.69	9.5	9.5	0.07
n519	7.79	6.6	6.61	0.07
n520	8.36	6.81	6.82	0.15
n521	8.12	6.93	6.94	0.07
n528	10.05	8.86	8.87	0.07
n529	9.91	8.45	8.47	0.45
n530	9.76	8.34	8.36	0.6
n531	9.66	8.26	8.28	0.68
n532	9.65	8.22	8.25	0.75
n533	9.43	8.1	8.13	0.82
n535	8.7	6.79	6.84	3.22
n536	9.19	7.74	7.75	0.15
n537	9.02	7.83	7.84	0.07
n538	9.91	7.26	7.29	1.5
n539	8.96	7.77	7.78	0.23
n540	9.24	8	8.01	0.15
n541	9.24	8.05	8.06	0.07
MH-1	8.77	3.08	3.25	34.2
MH-3	9.76	6.72	6.76	2.32
MH-4	9.87	8.42	8.44	0.52
MH-5	8.63	7.44	7.45	0.15
MH-8	9.92	8.73	8.73	0.07
MH-9	10.06	8.81	8.82	0.07
MH-10	9.47	6.57	6.62	2.48
MH-11	9.33	6.59	6.61	0.75
MH-17	8.29	6.35	6.38	1.2
MH-18	9.33	4.1	4.24	23.7
MH-19	7.2	5.66	5.68	0.82
m2	9.28	5.16	5.24	7.8
m3	9.32	5.26	5.34	7.73
m4	9.25	5.36	5.43	7.65
m6	9.22	5.46	5.54	7.57
m7	9.34	5.55	5.63	7.35
m8	9.5	5.65	5.73	7.27
m9	9.53	5.68	5.76	7.2
m10	9.63	5.75	5.82	5.32

m11	9.64	5.85	5.91	5.25
m12	9.64	5.95	6.01	5.17
m13	9.72	6.05	6.11	5.1
m14	9.64	6.13	6.19	5.02
m15	9.63	6.15	6.2	3.98
m16	9.6	6.25	6.3	3.9
m17	9.77	6.35	6.4	3.82
m18	9.92	6.44	6.49	3.75
m21	10.2	6.56	6.61	3.3
m22	10.18	6.64	6.69	3
m23	10.24	6.74	6.79	2.92
m24	10.28	6.81	6.86	2.85
m25	10.32	6.85	6.88	2.02
m26	10.45	6.97	7	1.95
m27	10.67	7.09	7.12	1.88
m28	10.77	7.21	7.24	1.8
m29	10.82	7.33	7.36	1.73
m31	10.79	7.53	7.56	1.57
m32	10.78	7.57	7.6	1.5
m33	10.74	7.69	7.72	1.43
m34	10.67	7.81	7.84	1.35
m35	10.59	7.93	7.96	1.28
m36	10.5	8.05	8.08	1.2
m37	10.48	8.17	8.19	1.12
m38	10.45	8.29	8.31	1.05
m39	10.48	8.32	8.35	0.97
m52	10.06	8.87	8.87	0.07
m53	9.77	8.58	8.59	0.15
m54	9.81	8.49	8.5	0.23
m55	9.87	8.46	8.47	0.3
m56	10.25	8.34	8.36	0.37
m57	10.34	8.22	8.24	0.45
m58	10.3	8.16	8.18	0.52
m59	10.38	8.1	8.12	0.6
m60	10.5	7.98	8	0.68
m61	10.58	7.91	7.94	0.9
m62	10.7	7.86	7.89	0.97
m63	10.9	7.71	7.74	1.28
m64	10.94	7.64	7.67	1.65
m66	10.88	7.5	7.53	1.73
m67	10.75	7.43	7.47	2.17
m68	10.68	7.39	7.43	2.25
m69	10.52	7.29	7.33	2.32
m70	10.56	7.24	7.28	2.78
m71	10.57	7.21	7.26	2.85
m72	10.59	7.19	7.24	2.92
m73	10.49	7.09	7.14	3
m74	10.56	6.99	7.04	3.07
m75	10.49	6.89	6.94	3.15
m76	10.53	6.87	6.93	4.73

m77	10.56	6.79	6.86	4.8
m78	10.48	6.7	6.76	4.87
m79	10.08	6.61	6.67	5.25
m81	9.94	6.58	6.65	6.3
m82	9.55	6.5	6.57	6.38
m83	9.53	6.45	6.52	6.6
m84	9.51	6.4	6.48	6.68
m85	9.32	6.3	6.38	6.75
m86	9.38	6.23	6.31	7.05
m87	9.33	6.2	6.28	7.13
m88	9.34	6.11	6.18	7.2
m89	9.34	4.56	4.65	9.38
m90	9.36	4.49	4.57	9.45
m91	9.53	4.39	4.49	10.28
m93	9.47	4.29	4.38	10.35
m94	9.18	4.19	4.28	10.42
m95	8.89	4.09	4.18	10.5
m96	8.8	3.97	4.06	10.65
m97	8.57	3.88	3.97	10.73
m98	8.61	3.85	3.96	14.47
m99	8.81	3.8	3.91	14.55
m100	9.22	3.73	3.84	14.62
m101	9.58	3.65	3.76	14.7
m102	9.69	3.58	3.69	14.78
m103	9.79	3.54	3.65	15.98
m104	9.41	3.5	3.62	16.05
m105	9.21	3.43	3.54	16.13
m106	9.04	3.35	3.47	16.2
m107	8.98	3.26	3.38	16.87
m108	8.87	3.23	3.35	16.95
m109	8.58	3.18	3.3	17.03
m110	8.43	3.13	3.25	17.1
m111	8.35	3.08	3.19	17.18
m112	8.23	3.02	3.14	17.25
m113	8.13	2.99	3.11	17.4
m114	8.07	2.97	3.1	17.47
m115	8.01	2.95	3.07	18.52
m116	7.9	2.92	3.05	18.6
m117	7.68	2.87	3	18.68
m119	6.98	2.82	2.95	19.12
m120	6.24	2.77	2.9	19.2
m121	5.02	2.72	2.84	19.28
m122	5.02	1.41	1.54	22.05
m123	4.87	1.39	1.53	22.13
m124	4.28	1.18	1.42	69.82
m143	9	7.81	7.82	0.15
m144	9.19	7.75	7.76	0.23
m145	9.84	7.63	7.64	0.3
m150	10.62	8.77	8.78	0.23
m151	10.1	8.89	8.9	0.15

m152	10.12	8.93	8.94	0.07
m153	9.74	8.03	8.04	0.07
m170	9.88	8.69	8.69	0.07
m171	10.17	8.57	8.58	0.15
m172	10.05	8.45	8.46	0.23
m173	10.36	8.33	8.34	0.3
m174	10.39	8.3	8.32	0.75
m175	10.46	7.99	8.02	1.2
m176	10.42	8.97	8.98	0.23
m177	10.28	9.09	9.1	0.15
m178	10.37	9.18	9.19	0.07
m179	10.66	7.51	7.54	1.5
m180	10.53	7.63	7.66	1.43
m181	10.4	7.75	7.78	1.35
m182	10.5	7.87	7.9	1.28
m184	10.49	8.11	8.13	0.9
m185	10.37	8.23	8.25	0.82
m186	10.33	8.46	8.48	0.37
m187	10.25	8.51	8.53	0.3
m221	10.07	8.63	8.65	0.23
m222	10.08	8.75	8.76	0.15
m223	9.98	8.79	8.8	0.07
m228	10.08	8.69	8.7	0.3
m229	10	8.81	8.82	0.23
m230	10.12	8.93	8.94	0.15
m231	10.48	9.29	9.29	0.07
m233	10.3	9.05	9.06	0.23
m235	10.15	7.92	7.94	0.6
m236	10.17	7.84	7.87	0.68
m237	10.15	7.82	7.85	0.97
m238	10.18	5.41	5.44	1.5
m239	9.99	5.3	5.33	1.57
m240	9.86	5.18	5.21	1.65
m241	9.86	5.12	5.16	1.8
m242	9.81	8.62	8.63	0.07
m243	9.81	5.02	5.06	1.88
m244	9.88	4.9	4.94	1.95
m245	9.74	4.78	4.82	2.02
m246	9.57	4.66	4.7	2.1
m247	10.11	7.84	7.86	0.75
m248	10.22	7.96	7.98	0.68
m249	10.06	8.06	8.08	0.52
m252	9.51	8.32	8.33	0.07
m253	9.54	8.35	8.37	0.15
m255	10.06	8.7	8.71	0.07
m256	9.38	8.13	8.14	0.23
m258	9.47	8.28	8.29	0.07
m259	9.7	8.04	8.05	0.23
m260	9.42	8.15	8.17	0.15
m261	9.49	8.3	8.3	0.07

m262	9.98	8.5	8.52	0.23
m263	9.86	8.62	8.63	0.15
m264	9.87	8.68	8.69	0.07
m265	9.74	5.53	5.54	0.45
m266	8.47	5.64	5.66	0.3
m267	7.44	5.76	5.77	0.15
m268	7.07	5.88	5.89	0.07
m269	9.82	8.24	8.25	0.23
m270	9.54	8.35	8.36	0.07
m272	9.05	7.86	7.87	0.07
m273	8.42	5.16	5.19	0.97
m274	8.07	5.28	5.31	0.9
m275	7.74	5.37	5.4	0.82
m276	7.23	5.47	5.49	0.68
m282	7.57	6.38	6.39	0.07
m283	6.78	5.59	5.61	0.6
m284	7.6	6.22	6.24	0.45
m285	7.71	6.25	6.26	0.15
m286	7.56	6.37	6.38	0.07
m287	8.49	6.71	6.72	0.23
m288	9.11	7.6	7.61	0.15
m289	9.2	7.99	7.99	0.07
m296	8.37	5.79	5.81	0.68
m298	9.62	5.33	5.36	1.05
m299	9.24	5.45	5.48	0.97
m300	8.75	5.56	5.58	0.82
m301	8.56	5.68	5.7	0.75
m302	8.29	5.91	5.93	0.52
m303	8.38	6.03	6.05	0.45
m304	7.97	6.15	6.16	0.37
m306	7.44	6.25	6.25	0.07
m307	8.1	6.7	6.71	0.15
m308	7.94	6.75	6.76	0.07
m309	8.47	7.24	7.25	0.07
m310	8.39	7.17	7.18	0.15
m311	8.18	6.04	6.07	1.12
m312	8.14	6.03	6.05	1.2
m313	7.96	5.91	5.94	1.28
m314	7.79	5.79	5.82	1.35
m315	7.72	5.73	5.76	1.65
m316	8.17	6.45	6.47	0.23
m317	7.95	6.63	6.64	0.07
m318	7.02	5.11	5.15	1.73
m319	6.11	4.07	4.1	2.1
m320	6.71	5.11	5.13	0.3
m321	7.41	5.82	5.83	0.23
m322	7.33	6	6.01	0.15
m323	7.23	6.04	6.05	0.07
m326	3.97	1.62	1.66	2.7
m327	4.01	1.72	1.76	2.63

m328	4.05	1.76	1.8	2.55
m329	3.07	1.88	1.89	0.23
m330	3.43	2.18	2.19	0.15
m331	3.46	2.27	2.27	0.07
m332	8.56	6.16	6.18	0.9
m333	8.72	6.24	6.27	0.82
m334	8.71	7.52	7.53	0.15
m335	8.88	7.69	7.69	0.07
m336	8.52	6.36	6.38	0.6
m337	8.43	6.4	6.42	0.52
m338	8.26	6.48	6.5	0.37
m339	8.06	6.56	6.57	0.3
m341	7.81	6.62	6.63	0.07
m342	8.29	6.86	6.87	0.15
m343	8.09	6.9	6.91	0.07
m344	8.45	7.26	7.27	0.07
m347	10.22	8.44	8.47	0.9
m349	10.28	8.59	8.61	0.82
m350	10.23	8.68	8.7	0.6
m351	10.22	8.71	8.73	0.52
m352	10.18	8.8	8.82	0.3
m353	10.3	8.92	8.93	0.23
m354	10.24	9.04	9.05	0.15
m355	10.53	9.34	9.35	0.15
m356	10.61	9.42	9.42	0.07
m357	10.43	9.24	9.25	0.15
m358	10.71	9.38	9.39	0.07
m359	10.77	9.35	9.36	0.15
m360	10.64	9.45	9.46	0.07
m361	11.06	9.66	9.68	0.3
m362	10.97	9.78	9.79	0.23
m363	11.09	9.9	9.91	0.07
m364	11.09	9.9	9.91	0.07
m365	11.12	9.28	9.3	0.37
m366	11	9.31	9.33	0.3
m367	10.61	9.42	9.43	0.07
m368	10.81	9.62	9.63	0.15
m369	10.96	9.77	9.78	0.07
m370	10.57	9.38	9.39	0.15
m371	10.29	9.1	9.11	0.23
m372	10.32	8.98	8.99	0.3
m373	10.35	8.86	8.87	0.37
m374	10.52	8.76	8.78	0.82
m375	10.63	9.21	9.22	0.3
m376	10.61	9.33	9.34	0.23
m377	10.66	9.45	9.46	0.15
m378	10.71	9.52	9.52	0.07
m379	10.53	8.72	8.75	0.97
m380	10.77	9.52	9.53	0.07
m381	10.33	8.62	8.64	1.05

m382	10.23	8.54	8.57	1.43
m383	10.23	8.5	8.53	1.5
m384	10.36	8.41	8.45	1.57
m385	10.14	8.4	8.44	2.48
m386	10.19	8.52	8.54	0.82
m387	10.2	8.64	8.66	0.75
m388	10.26	8.76	8.78	0.68
m391	10.28	9.09	9.1	0.37
m392	10.35	9.16	9.17	0.15
m393	10.75	9.43	9.44	0.07
m394	10.39	9.08	9.1	0.3
m395	10.41	9.22	9.23	0.07
m396	10.09	8.33	8.38	2.55
m397	10.17	8.23	8.28	2.63
m399	10.12	8.13	8.17	2.92
m400	9.99	8.8	8.82	0.23
m401	10.14	8.95	8.96	0.15
m402	10.32	9.13	9.14	0.07
m403	10.16	8.54	8.56	0.75
m404	10.24	8.66	8.68	0.68
m405	10.42	8.78	8.8	0.6
m406	10.48	8.9	8.91	0.52
m408	10.39	9.03	9.05	0.45
m409	10.45	9.26	9.27	0.07
m410	10.5	9.15	9.16	0.3
m411	10.75	9.24	9.25	0.23
m412	10.69	9.5	9.51	0.07
m413	10.5	9.31	9.32	0.07
m415	10.22	9.03	9.04	0.15
m416	10.29	9.1	9.11	0.07
m417	10.16	8.79	8.8	0.23
m418	10.15	8.91	8.92	0.15
m419	10.24	9.05	9.05	0.07
m420	10.04	8.58	8.6	0.37
m421	9.94	8.7	8.72	0.3
m422	10.02	8.82	8.84	0.23
m423	10.13	8.94	8.95	0.15
m424	10.19	9	9.01	0.07
m425	9.58	8.01	8.03	0.97
m426	9.63	8.13	8.15	0.9
m427	9.72	8.25	8.27	0.82
m428	9.9	8.37	8.39	0.75
m430	9.85	8.5	8.52	0.68
m431	9.94	8.61	8.62	0.37
m432	9.92	8.73	8.74	0.3
m433	10.16	8.97	8.98	0.15
m434	10.34	9.15	9.15	0.07
m435	9.35	8.16	8.17	0.15
m437	9.29	8.03	8.05	0.37
m438	9.98	8.36	8.37	0.15

m439	10.08	8.89	8.9	0.07
m440	9.96	8.77	8.78	0.23
m441	10.09	8.9	8.91	0.15
m442	10.23	9.04	9.05	0.07
m443	9.66	7.92	7.94	0.52
m444	10.54	7.8	7.83	0.6
m445	10.89	7.78	7.83	3.82
m446	10.84	7.84	7.89	3.15
m447	10.55	9.36	9.37	0.15
m448	10.52	9	9.02	0.37
m449	10.42	8.76	8.78	0.68
m450	10.48	8.65	8.67	0.75
m451	10.37	8.53	8.55	0.82
m452	10.26	8.41	8.44	0.9
m453	9.91	8.29	8.32	0.97
m454	10.36	9.12	9.13	0.15
m455	10.37	9.18	9.19	0.07
m456	10.19	8.04	8.08	3
m457	10.53	7.94	7.99	3.07
m458	10.97	7.7	7.76	3.9
m459	10.97	7.66	7.71	4.13
m460	10.18	8.62	8.63	0.15
m461	9.85	8.66	8.67	0.07
m462	10.5	8.88	8.89	0.23
m463	10.51	9	9.01	0.15
m464	10.31	9.12	9.13	0.07
m465	10.9	7.6	7.66	4.2
m466	10.65	7.5	7.56	4.28
m467	10.62	7.4	7.46	4.35
m468	10.6	7.31	7.36	4.43
m469	10.59	7.28	7.34	4.65
m470	9.96	8.53	8.54	0.15
m471	9.82	8.63	8.64	0.07
m472	9.62	7.22	7.26	1.8
m473	9.51	7.34	7.38	1.73
m474	9.61	7.46	7.5	1.65
m475	9.64	7.58	7.62	1.57
m476	9.81	7.7	7.73	1.5
m477	9.83	7.83	7.86	1.43
m478	9.82	7.94	7.97	1.2
m479	9.87	8.04	8.07	1.12
m480	9.94	8.24	8.27	0.75
m481	10.22	8.36	8.39	0.68
m482	10.31	8.43	8.45	0.6
m483	10.3	9.11	9.13	0.15
m484	10.52	7.02	7.08	4.87
m485	10.32	8.55	8.56	0.37
m486	10.32	8.67	8.68	0.3
m487	10.24	8.79	8.8	0.15
m488	10.13	8.94	8.95	0.07

m489	9.86	8.46	8.47	0.15
m490	9.77	8.58	8.59	0.07
m491	9.93	8.16	8.18	0.3
m492	10.16	8.28	8.29	0.23
m493	9.59	8.4	8.41	0.07
m494	10.57	7.21	7.27	4.73
m495	10.54	7.11	7.17	4.8
m496	10.49	6.94	7	5.7
m497	10.4	6.81	6.88	5.77
m498	10.32	6.71	6.78	5.85
m499	10.2	6.61	6.68	5.93
m500	9.97	6.54	6.61	6.08
m501	10.43	7.77	7.79	0.75
m502	10.06	7.89	7.91	0.68
m503	9.9	7.96	7.98	0.6
m506	9.73	8.22	8.24	0.23
m507	9.59	8.4	8.4	0.07
m508	9.56	8.37	8.38	0.07
m509	9.45	8.26	8.26	0.07
m510	8.88	4.97	5.08	15.9
m511	9.35	5.18	5.25	8.03
m512	9.69	5.28	5.36	7.95
m513	9.4	5.37	5.45	7.87
m514	9.23	5.47	5.55	7.8
m515	8.66	5.57	5.65	7.73
m516	8.38	5.67	5.75	7.35
m517	8.96	7.65	7.66	0.15
m518	8.91	7.72	7.72	0.07
m519	8.15	5.77	5.85	7.27
m520	8.45	5.87	5.94	7.2
m521	8.89	5.91	5.98	7.13
m522	8.91	5.97	6.04	6.82
m523	9.06	6.04	6.11	6.75
m525	9.15	6.07	6.14	6.53
m526	9.42	6.16	6.24	6.38
m527	9.64	6.26	6.33	6.3
m528	9.7	6.36	6.43	6.23
m529	9.87	6.46	6.53	6.15
m531	10.25	7.74	7.77	0.9
m532	10.44	7.6	7.62	0.97
m533	10.49	7.48	7.5	1.12
m534	10.45	7.41	7.44	1.43
m535	10.42	7.36	7.39	1.5
m536	10.02	7.28	7.33	2.25
m537	9.5	7.25	7.29	2.48
m539	9.23	7.15	7.19	2.55
m540	8.93	7.05	7.09	2.63
m541	8.62	6.98	7.02	2.7
m542	10.06	8.36	8.38	0.68
m543	9.7	8.48	8.5	0.52

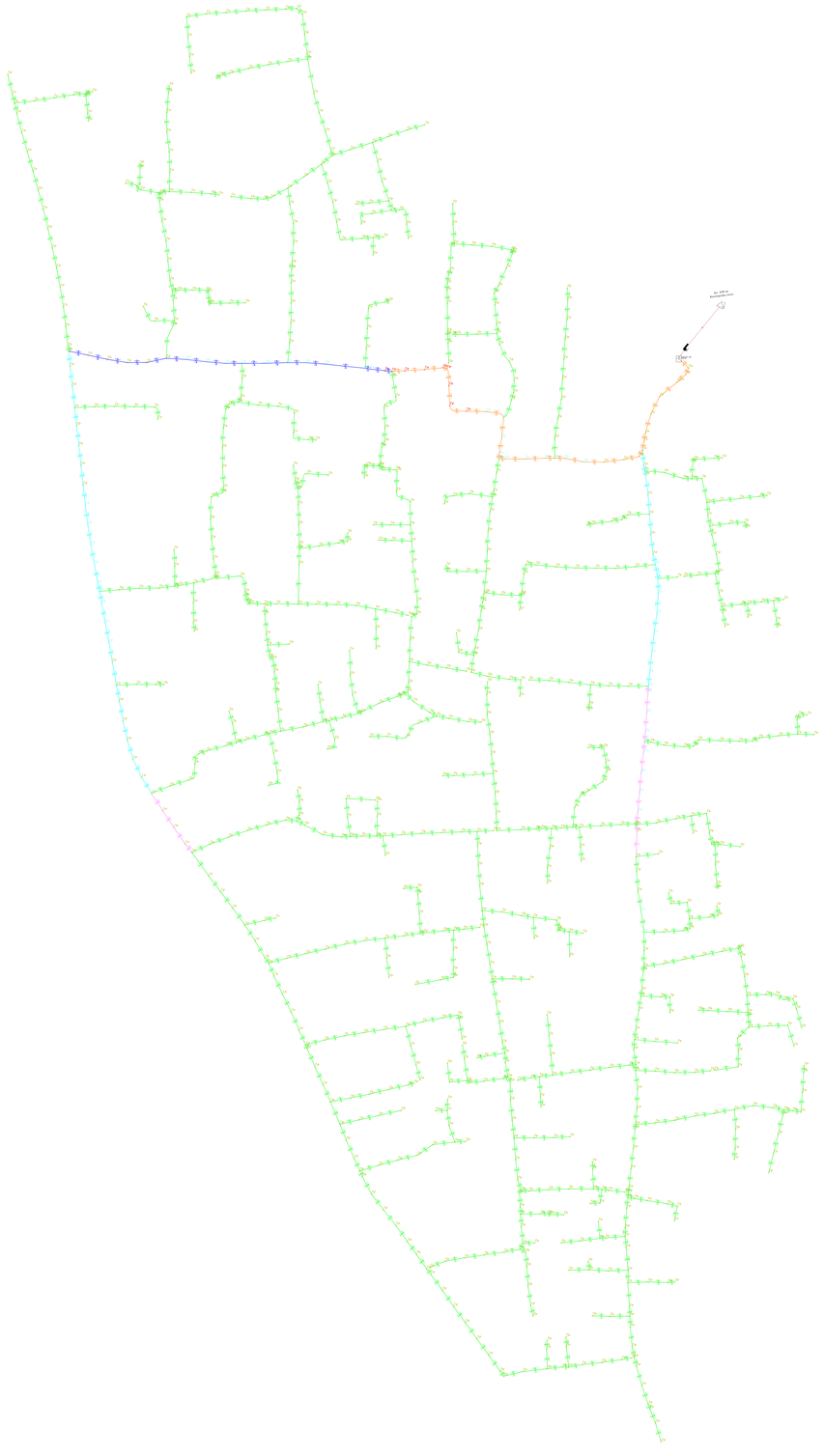
m544	9.8	8.6	8.62	0.45
m545	9.91	8.72	8.73	0.3
m546	10.19	9	9.01	0.15
m547	10.25	9.06	9.07	0.07
m548	10.57	9.04	9.06	0.23
m549	10.42	9.16	9.17	0.15
m550	10.44	9.25	9.26	0.07
m551	9.85	8.36	8.37	0.15
m552	9.64	8.45	8.45	0.07
m553	8.8	7.61	7.62	0.07
m554	10.09	7.85	7.87	0.82
m556	10.63	9.16	9.18	0.23
m557	10.62	9.23	9.24	0.15
m558	10.64	9.45	9.45	0.07
m559	10.48	9.29	9.3	0.15
m560	10.18	8.99	9	0.23
m562	9.87	8.68	8.7	0.45
m563	9.63	8.44	8.46	0.52
m564	9.46	8.09	8.11	0.6
m565	10.52	9.33	9.34	0.07
m566	10.05	8.81	8.82	0.15
m567	10.03	8.84	8.85	0.07
m570	8.34	7.11	7.14	0.97
m571	8.55	7.36	7.38	0.9
m572	8.76	7.57	7.59	0.82
m573	9.16	7.87	7.89	0.75
m574	9.38	8.19	8.22	0.68
m575	9.75	8.49	8.51	0.6
m576	10.24	8.76	8.78	0.45
m577	10.24	8.88	8.89	0.37
m578	10.26	8.89	8.9	0.3
m579	10.17	8.98	8.98	0.07
m580	10.4	9.14	9.15	0.15
m581	10.44	8.45	8.48	0.97
m583	7.87	6.62	6.63	0.23
m584	8.06	6.87	6.88	0.15
m585	8.43	6.95	6.95	0.07
m586	10.5	9.03	9.05	0.3
m587	10.27	9.08	9.09	0.15
m588	10.05	8.86	8.87	0.23
m589	10.02	8.74	8.75	0.3
m590	10.06	8.62	8.63	0.37
m591	10.02	8.09	8.11	0.68
m592	10.01	7.97	7.99	0.75
m593	10.33	8.91	8.93	0.37
m594	10.41	8.79	8.81	0.68
m595	10.32	8.67	8.7	0.75
m596	10.39	8.55	8.58	0.82
m597	10.38	8.5	8.53	0.9
m599	10.44	8.31	8.34	1.28

m600	10.43	8.19	8.22	1.35
m601	10.34	8.07	8.11	1.43
m602	10.03	7.95	7.99	1.5
m603	9.61	7.83	7.87	1.88
m604	9.14	7.71	7.75	1.95
m605	8.76	2.42	2.61	46.35
m606	8.47	2.39	2.58	46.43
m607	8.07	2.36	2.55	46.5
m608	7.73	2.33	2.52	47.33
m609	7.56	2.3	2.49	47.4
m610	6.44	2.27	2.46	47.48
m611	5.08	2.24	2.43	47.55
m613	4.12	1.17	1.41	69.9
m614	3.98	1.16	1.4	69.97
m615	3.93	1.13	1.36	70.05
m616	3.7	1.1	1.33	70.12
m617	3.59	1.07	1.25	70.2
m618	2.44	0.97	1.15	70.28
m620	2.39	0.92	1.14	70.35
MH-20	9.71	7.86	7.9	1.8
MH-21	8.9	2.43	2.62	46.28
MH-22	7.9	2.34	2.54	47.25
MH-38	10.48	9.29	9.3	0.15
MH-39	10.46	9.13	9.14	0.23
MH-40	10.45	9.14	9.16	0.15
MH-44	9.4	8.19	8.2	0.15
MH-45	10.2	8	8.02	0.6
MH-46	9.57	8.29	8.3	0.15
MH-47	9.79	8.16	8.17	0.23
MH-48	9.68	8.26	8.27	0.15
MH-49	7.54	5.76	5.78	0.52
MH-50	10.23	8.71	8.72	0.23
MH-51	10.15	8.94	8.95	0.23
MH-54	9.66	8.01	8.03	0.45
MH-57	9.74	8.16	8.18	0.3
MH-59	9.78	8.1	8.12	0.45
MH-60	10	8.32	8.33	0.15
MH-61	9.45	5.58	5.6	0.37
MH-63	7.62	5.7	5.71	0.23
MH-64	10.39	9.14	9.15	0.15
MH-65	10.14	8.95	8.96	0.3
MH-69	8.44	5.87	5.89	0.6
MH-70	8.15	6.67	6.68	0.23
MH-74	7.73	6.54	6.56	0.15
MH-76	4.89	3.01	3.05	2.17
MH-77	3.16	1.86	1.88	0.3
MH-78	8.39	3.67	3.81	24.38
MH-81	10.13	8.7	8.72	0.52
MH-83	10.39	8.82	8.84	0.6
MH-84	10.39	9.07	9.08	0.15

MH-85	10.15	7.39	7.42	1.43
MH-86	9.86	8.66	8.68	0.37
MH-89	10.17	8.95	8.96	0.23
MH-90	10.55	9.12	9.14	0.37
MH-91	10.81	7.42	7.45	1.65
MH-92	10.75	9.56	9.56	0.07
MH-93	10.29	9.1	9.11	0.07
MH-94	10.32	7.55	7.57	0.37
MH-95	10.41	9.17	9.18	0.07
MH-96	9	5.51	5.53	0.9
MH-97	9.86	5.25	5.27	1.12
MH-99	8.44	7.25	7.26	0.07
MH-102	10.48	7.5	7.53	1.05
MH-103	10.73	9.54	9.55	0.07
MH-104	10.53	9.34	9.35	0.07
MH-105	10.03	8.37	8.38	0.07
MH-106	10.48	9.29	9.3	0.07
MH-107	4.7	2.21	2.39	47.63
MH-108	7.65	6.46	6.48	0.3
MH-109	7.64	6.12	6.14	0.37
MH-110	10.42	9.23	9.24	0.07
MH-112	9.33	7.8	7.8	0.07
MH-113	10.21	9.02	9.03	0.07
MH-115	10.42	9.22	9.23	0.07
MH-116	10.05	8.85	8.87	0.3
MH-117	9.51	8.32	8.33	0.07
MH-118	9.98	7.7	7.72	0.97
MH-119	9.96	8.77	8.78	0.07
MH-120	9.76	8.44	8.46	0.6
MH-121	8.28	6.19	6.23	2.78
MH-122	8.29	5.68	5.73	3.3
MH-123	9.6	8.41	8.42	0.15
MH-124	10.04	8.16	8.18	0.68
MH-125	8.63	7.31	7.32	0.15
MH-126	7.63	6.31	6.32	0.23
MH-128	9.71	8.15	8.17	0.37
MH-129	9.29	8.09	8.1	0.15
MH-130	10.27	8.91	8.93	0.6
MH-132	10.42	9.23	9.24	0.07
MH-134	10.24	9.05	9.06	0.07
MH-135	9.89	8.59	8.6	0.07
MH-136	10.43	9.24	9.24	0.07
MH-144	8.18	4.16	4.19	1.8

APPENDIX 2 - DRAWINGS

Sewerage Network of Kureepuzha West and Vallikkeezhu divisions



LEGEND

- 225 HDPE
- 280 HDPE
- 355 HDPE
- 450 HDPE
- 560 HDPE
- PUMPING LINE
- PUMP
- MAN HOLE
- LIFTING MAN HOLE

KERALA WATER AUTHORITY
PPD CAMP OFFICE KOLLAM
Sewerage network of Kureepuzha West and Vallikkeezhu divisions

SEW NETWORK MAP

SCALE : 1:40

ASST. ENGINEER	ASST. EXE. ENGINEER	EXECUTIVE ENGINEER	SUPT. ENGINEER